Tennessee Department of Environment and Conservation

DOE Oversight Division

Status Report to the Public

Fiscal Year 2006

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Terms & Acronyms

ATSDR	Agency for Toxic Substances and Disease Registry
BJC	Bechtel Jacobs Company LLC
BMAP	Biological Monitoring and Abatement Program
CAP	Citizens' Advisory Panel
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ERAMS	Environmental Radiation Ambient Monitoring System
ETTP	East Tennessee Technology Park
FFA	Federal Facility Agreement
FFA parties	DOE, EPA, and the state
FY	fiscal year
HFIR	High Flux Isotope Reactor
LLW	low-level (radioactive) waste
LOC	Oak Ridge Reservation Local Oversight Committee, Inc.
mrem	millirem, a measure of the effect of radiation on the body
MSRE	Molten Salt Reactor Experiment
NEPA	National Environmental Policy Act of 1969
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
PCBs	polychlorinated biphenyls
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PHA	public health assessment
RCRA	Resource Conservation and Recovery Act of 1976
REDC	Radiochemical Engineering and Development Center
ROD	Record of Decision
SWSA	Solid Waste Storage Area
TDEC	Tennessee Department of Environment and Conservation
TEMA	Tennessee Emergency Management Agency
TOA	Tennessee Oversight Agreement
TRU	transuranic
TSCA	Toxic Substances Control Act of 1976
TVA	Tennessee Valley Authority
UF_6	uranium hexafluoride
VOC	volatile organic compound

Executive Summary

BACKGROUND

In 1942, construction began on enormous complexes across the nation created to support the Manhattan Project, a massive, top-secret effort during World War II to build the atomic bomb. The 35,545-acre Oak Ridge Reservation (ORR) in Tennessee remains as a legacy to the Manhattan Project and to the Cold War that followed. The ORR is currently owned by the U.S. Department of Energy (DOE), and approximately 15 percent of its total area is contaminated by hazardous and radioactive materials.

During World War II, four plants were built on the ORR to create materials for nuclear weapons; these plants were given the code names S-50, K-25, Y-12, and X-10. S-50, a thermally operated uranium enrichment facility, ran for about a year and was dismantled when it proved inefficient. K-25 and Y-12 enriched uranium using more successful techniques: K-25 used gaseous diffusion and Y-12 used electromagnetic separation. X-10 developed the technology to produce plutonium, which was then transferred to the Hanford Plant in Washington state for full-scale production.

This status report summarizes the state of Tennessee's perspective on federal cleanup progress at the ORR.

K-25, Y-12, and X-10 still exist as East Tennessee Technology Park (ETTP), the Y-12 National Security Complex, and Oak Ridge National Laboratory (ORNL). During the Cold War, these facilities played a key role in maintaining materials and components for nuclear weapons and in preserving a technological lead over the Soviet Union. In the past decade, the missions of Y-12 and ORNL have continued to evolve, while ETTP will be cleaned up for eventual use as a private-sector industrial park.

Over the last 60 years, DOE and agencies that preceded it contaminated more than 500 sites on or near the ORR. This legacy of contamination is being remediated to levels that comply with current environmental laws, particularly the Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

SCOPE OF THIS STATUS REPORT

The Tennessee Department of Environment and Conservation DOE Oversight Division (the "division") performs independent monitoring and oversight of DOE's cleanup and waste-management actions. The division has performed this role since the Tennessee Oversight Agreement was signed in 1991. This status report summarizes the state of Tennessee's perspective on federal cleanup progress at the ORR for fiscal year (FY) 2006. The results of state monitoring and analysis are also evaluated, as are the quality and effectiveness of DOE environmental monitoring and surveillance programs.

Executive Summary

MAJOR FINDINGS

DOE has continued to make good progress under the Accelerated Cleanup Plan begun in 2002. At ETTP, decontamination and decommissioning (D&D) of the three youngest gaseous diffusion buildings has been essentially completed. At ORNL, DOE has made progress in capping the radioactive waste burial grounds in Melton Valley, with several sites completed. Nearly all of the uranium hexafluoride at ETTP has been shipped to the Portsmouth Gaseous Diffusion Plant in Ohio, with only problematic containers remaining at ETTP. The backlog of low-level legacy waste has been worked down so that only "orphan" wastes remain, awaiting a disposal pathway.

A major challenge will be obtaining the resources to continue the necessary cleanup work.

DOE still faces decisions regarding cleanup of groundwater and D&D of deteriorating facilities at ORNL and Y-12. A major challenge will be obtaining the resources to continue the necessary cleanup work.

Cleanup of the ORR will leave the reservation much less hazardous to people and the environment; nevertheless, continued maintenance, monitoring, and institutional controls—effective "stewardship"—will be required even after cleanup activities are completed.

KEY ISSUES AND CHALLENGES

The division has identified several areas that continue as cause for concern to DOE, regulatory agencies, and the community. Satisfactory resolution of these issues may be time consuming and costly. The key issues and challenges are listed below and described more fully in Section 5.

- Groundwater management strategies,
- Long-term stewardship responsibilities,
- The federal commitment,
- Characterization and disposal of radioactive waste, and
- Incorporating historic preservation into cleanup activities.

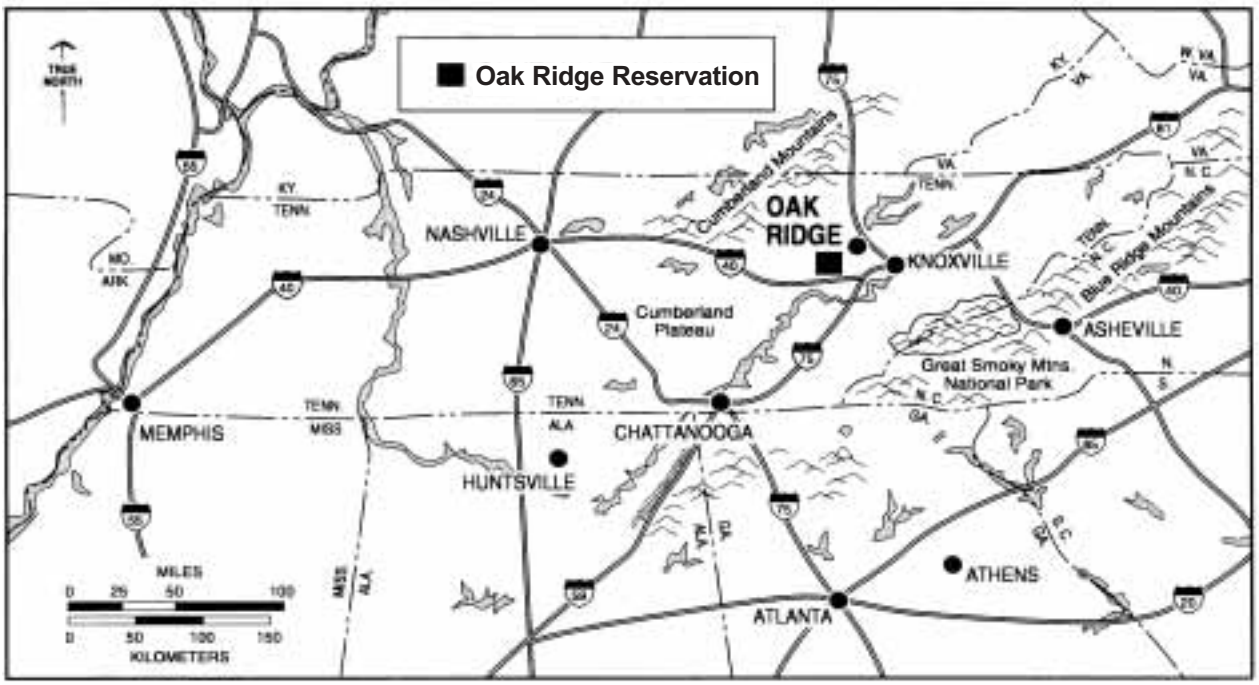
1.0 Introduction

1.1 HISTORY OF THE PROBLEM

Oak Ridge, Tennessee, was created in 1942 to support the Manhattan Project, the secret World War II effort to develop the atomic bomb. After the war ended, plant research and production supported the Cold War arms buildup. The U.S. Department of Energy (DOE) and its predecessor agencies left a legacy of buildings, lands, and waters contaminated by radioactive and hazardous wastes. Especially in the early years, toxic and radioactive materials washed down streams and were released into the air from government lands.

Three major industrial complexes remain on the Oak Ridge Reservation (ORR)—the Y-12 National Security Complex (formerly known as the Y-12 Plant), East Tennessee Technology Park (ETTP, formerly known as the K-25 Site and as the Oak Ridge Gaseous Diffusion Plant), and Oak Ridge National Laboratory (ORNL, formerly known as X-10). The missions of these facilities have changed over the years, but they continue to produce radioactive and hazardous wastes and to discharge small amounts of these substances into the environment. These activities are now regulated under federal and state laws and permits.

During World War II, Y-12 enriched uranium using an electromagnetic process; this process turned out to be relatively inefficient and was ultimately abandoned in favor of gaseous diffusion. Y-12 then became the center for precision machining of special nuclear materials for nuclear weapons manufacturing. Y-12 now refurbishes and



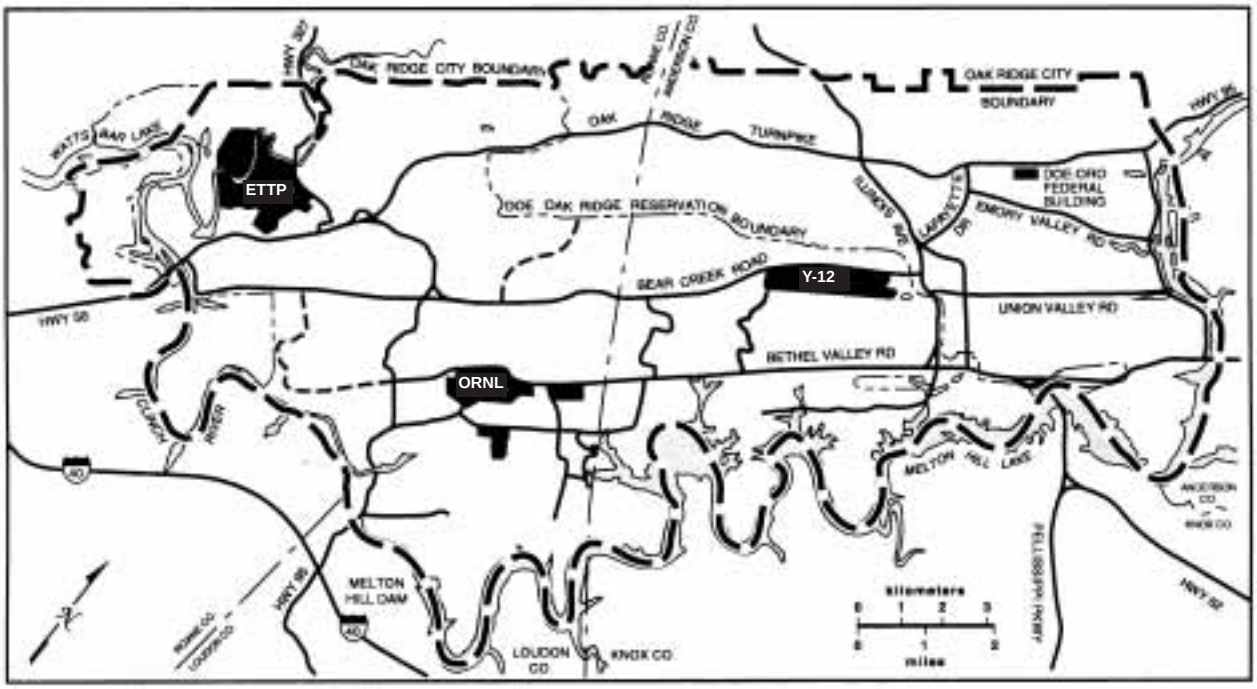
The Oak Ridge Reservation is located in East Tennessee. Map courtesy of U.S. Department of Energy (Oak Ridge Reservation Annual Site Environmental Report for 1998, DOE/ORO/2091).

1.0 Introduction

disassembles nuclear weapons and is the national repository for highly enriched uranium. It has also been designated the National Prototype Center in recognition of the unique expertise of its machinists.

K-25, the first gaseous diffusion plant, gave its name to the surrounding industrial complex. The complex ceased producing enriched uranium in the 1980s and refocused its mission on environmental management. Now known as Heritage Center at ETTP, its current goal is to transfer reusable buildings to the private sector, a process known as "reindustrialization." Those facilities that are too contaminated to renovate are being demolished. After cleanup is complete, ETTP will become a private-sector industrial park. The Toxic Substances Control Act of 1976 (TSCA) Incinerator is also located at ETTP. This is the nation's only facility permitted to incinerate radioactive waste mixed with hazardous waste containing polychlorinated biphenyls (PCBs), and it is key to cleanup of the ORR and other DOE sites. The TSCA Incinerator's life span has been extended 3 years; it is now scheduled to operate through 2009.

The X-10 plant originally pursued weapons research and development and piloted the purification technique for plutonium production. Today, ORNL conducts research in a wide variety of scientific fields, including supercomputing, biological systems, advanced materials, energy, and national security. It is renowned for its contributions to neutron science and is the site of the newly constructed Spallation Neutron Source, which will produce pulsed neutron beams for research.



The Oak Ridge Reservation lies about 20 miles west of Knoxville and straddles Roane and Anderson Counties. Map courtesy of U.S. Department of Energy (Oak Ridge Reservation Annual Site Environmental Report for 1998, DOE/ORO/2091).

1.0 Introduction

The story of Oak Ridge and details of the environmental damage caused by improper waste disposal are given in a community publication, *Oak Ridge, Tennessee: A Citizen's Guide to the Environment*. This publication can be found online at <www.oakridge.doe.gov/em/ssab/Publications/Citizens%20Guide.pdf>.

1.2 DIVISION OBJECTIVES

The Tennessee Department of Environment and Conservation (TDEC) formed a DOE Oversight Division ("the division") in 1991 under the Tennessee Oversight Agreement (TOA). The division pursues five primary objectives:

- To monitor and enforce DOE's compliance with applicable laws, regulations, Oak Ridge Federal Facility Agreement (FFA) provisions, the TOA, DOE Orders, administrative policies, approved procedures, and appropriate guidelines;
- To evaluate the effectiveness of radiological controls implemented on the ORR by DOE and its contractors;
- To characterize and identify radiological and hazardous contaminants and exit pathways on the ORR and in surrounding areas and to determine the potential impact of DOE activities on the welfare of Tennessee's citizens and environment;
- To support DOE in employing the corrective measures necessary to provide a healthful environment for the citizens of the state; and
- To monitor contaminant releases under conditions of emergency response and provide requested services to the Tennessee Emergency Management Agency (TEMA) as described in its Multi-Jurisdictional Emergency Response Plan for the ORR.

***The story of Oak Ridge and details of damage caused by improper waste disposal are given in* Oak Ridge, Tennessee: A Citizen's Guide to the Environment.**

The results of these activities and the current status of environmental health on the ORR are summarized in this report.

2.0 Jurisdiction

2.1 TENNESSEE OVERSIGHT AGREEMENT AND THE DOE OVERSIGHT DIVISION

The state of Tennessee and DOE signed the TOA in 1991, and TDEC created the division the same year to carry out its responsibilities under the agreement. The TOA provides a framework and funding for the state to oversee DOE's impact on the community in four ways:

- A regulatory program to support state participation in the FFA (see Section 2.2),
- A non-regulatory program of independent environmental monitoring and oversight to supplement activities conducted under applicable environmental laws and regulations,
- An emergency response program to help ensure that the state and local communities are prepared in case DOE creates an off-site emergency, and
- An outreach program to increase public awareness and involvement by citizens and local governments in DOE's Oak Ridge operations.

2.2 FEDERAL FACILITY AGREEMENT

The state, DOE, and the U.S. Environmental Protection Agency (EPA) ratified the FFA in 1992. It provides a legal framework allowing the division to enforce DOE cleanup of contamination from past ORR activities. Oak Ridge has an FFA because the ORR is listed on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) National Priorities List.

The division coordinates state activities under the FFA. The agreement itself outlines a procedure for cleanup on the reservation, including the identification of problems, scheduling of activities, and implementation and monitoring of appropriate responses. Actions taken under the FFA conform to CERCLA, the Resource Conservation and Recovery Act of 1976 (RCRA), and other federal and state laws.

The FFA allows the division to enforce DOE cleanup of contamination from past activities.

The National Environmental Policy Act of 1969 (NEPA) applies to proposed federal actions that could significantly affect the human environment, requiring federal agencies to consider environmental impacts and provide for public review and comment. Although NEPA reviews are not required for projects performed under CERCLA, DOE is required to incorporate NEPA values (i.e., consideration of public input on potential impacts to the environment) into CERCLA actions.

CERCLA documents related to cleanup decisions on the ORR are available for the public to review at DOE's Information Center (see Section 7.4.4).

2.3 NATIONAL ENVIRONMENTAL POLICY ACT

NEPA requires federal agencies to ensure that citizen participation and environmental impacts are properly factored into the agency's decision-making.

The division commented on the following NEPA documents in fiscal year (FY) 2006:

- *National Environmental Policy Act, Environmental Assessment (DOE/EA-1548) for the Y-12 Potable Water System Upgrade.* The purpose of this action is to install two new elevated water tanks, a pumping station, and system supply lines north of Bear Creek Road. A Finding of No Significant Impact was issued in April 2006.

- *National Environmental Policy Act, Environmental Assessment (DOE/EA-1514) for Conveyance of Parcel ED-6 to the City of Oak Ridge, Tennessee.* The proposed action is for the transfer of approximately 360 acres of land to the city of Oak Ridge. DOE is continuing to consult with the U.S Fish and Wildlife Service regarding the completion of the biological assessment.

- *National Environmental Policy Act, Environmental Impact Statement (DOE/EIS-0373) for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power Systems.* The purpose of this action is to consolidate radioisotope power systems production at a single site to reduce the security threat in a cost-effective manner. The final environmental impact statement is pending.

NEPA requires decisions to be made through a sustained process of inquiry, analysis, and learning. It ensures that federal agencies provide the public an opportunity to learn about and comment on significant proposals. When followed as required, it ensures adequate planning and prevents costly mistakes.

NEPA documents related to federal decisions affecting the ORR are available for the public to review at DOE's Information Center (see Section 7.4.4).

2.4 OTHER PLANNING AND POLICY ISSUES

The division also reviewed and commented on the following:

- *Notice of Intent to Prepare a Site-Wide Environmental Impact Statement for the Y-12 National Security Complex.* The purpose of this action is to evaluate new proposals as well as update the analyses presented in the original sitewide environmental impact statement (DOE/EIS-0309) issued in November 2001.

- *Annual Report Calendar Year 2004, Implementation of Mitigation Action Plan (MAP) for Lease of Land Parcels ED-1 on the Oak Ridge Reservation, Oak Ridge, Tennessee.* The environmental assessment (DOE/EA1113/MAP-04) for DOE to lease the approximately 957-acre parcel ED-1 to the Community Reuse Organization of East Tennessee resulted in a Finding of No Significant Impact, conditioned upon the implementation of a mitigation action plan annual report by DOE of the sensitive areas of ED-1.

2.0 Jurisdiction

ENVIRONMENTAL LAWS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980

Commonly known as "Superfund," CERCLA was enacted in 1980. It establishes a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. It also sets up rules governing these sites and holding those responsible for the contamination liable.

CERCLA lays out the steps through which DOE must proceed in cleanup planning under its environmental restoration program. The "CERCLA process" guides DOE through seven clearly defined steps:

- Planning,
- Investigation,
- Feasibility analysis,
- Development of alternatives,
- Public participation,
- Selection of alternatives, and
- Creation of a final, legal decision embodied in a document known as a Record of Decision (ROD).

The ROD is a key milestone in CERCLA decisions because it establishes the legal and technical requirements for a given cleanup. Once the state and EPA have signed a ROD, DOE is responsible for carrying out the actions outlined in the document. The ROD and cleanup actions taken under it are designed to ensure that all unacceptable risks to human health and the environment are eliminated or controlled as much as possible.

The state is responsible under the FFA for coordinating, reviewing, commenting on, and approving each phase of the CERCLA cleanup. The phases include remedial investigations, feasibility studies, RODs, remedial designs, remedial actions, and follow-up evaluations. These phases are present to ensure success of the cleanup. The FFA involves the state directly in program management, dispute resolution, project prioritization, and milestone scheduling.

Resource Conservation and Recovery Act of 1976

This law gives EPA authority to control hazardous waste from "cradle to grave." It covers the generation, transportation, treatment, storage, and disposal of hazardous waste. It also provides a framework for managing non-hazardous wastes. RCRA focuses only on active and future facilities.

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DOE's waste management program must answer to the state's delegated authority under RCRA. The division does not enforce RCRA regulations, but it can and does document violations, which are then handled by TDEC's Division of Solid Waste Management.

National Environmental Policy Act of 1969

NEPA is the overall national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. NEPA requires DOE and other federal agencies to provide public officials and citizens with environmental information regarding proposed federal actions that could affect the quality of the environment. With regard to major decisions regarding CERCLA activities, DOE has incorporated "NEPA values," including public participation and broad assessment of possible impacts. The division's NEPA program reviews NEPA documents that pertain to DOE activities on the ORR.

Natural Resources Damage Assessment

The division also participates in Natural Resources Damage Assessment activities. Federal law authorizes this program, which gives natural resource trustees at the state and federal level a means of recovering environmental damages caused by releases from CERCLA sites. Specifically, the program is intended to address damages that cannot be effectively corrected through cleanup.

As of this writing, the state and DOE have reached a partial settlement regarding compensation for natural resource damage to Lower Watts Bar Reservoir. The partial settlement is in the form of a permanent conservation easement on approximately 3,000 acres of undeveloped ORR lands north of Horizon Center at ETTP.

Other Laws

Other laws applicable to environmental management at the ORR include the following:

- Clean Air Act (1970),
- Clean Water Act (1977),
- Emergency Planning and Community Right-to-Know Act (1986),
- Federal Hazardous Substance Act (1966),
- Federal Facility Compliance Act (1992),
- Safe Dam Act (1973),
- Safe Drinking Water Act (1974),
- Solid Waste Disposal Act (1965), and
- Toxic Substances Control Act (1976).

2.0 Jurisdiction

2.5 NATURAL RESOURCES DAMAGE ASSESSMENT

In March 2005, the state and DOE finalized an Indefinite Term Easement setting aside approximately 3,000 acres on the ORR for conservation purposes. This easement is located on portions of Black Oak Ridge and McKinny Ridge near ETTP. This conservation easement is intended to partially offset natural resource damage caused to Watts Bar Reservoir by contamination released from the reservation. The property will be managed by the state for natural resource management and low-impact recreational opportunities.

A DOE contractor is developing a cross-walk assessment comparing the damage to Lower Watts Bar Reservoir with the resource value of the conservation easement. Once this assessment has been completed and reviewed by the Natural Resources Damage Assessment Trustee Council, a decision will be made as to whether the easement fully offsets damage to the reservoir.

TDEC photo

This cave located on Black Oak Ridge in rock similar to those on the ORR illustrates the effect that water and time have over rocks in a karst environment.

3.0 Environmental Management

3.1 RECENT PROGRESS

3.1.1 Environmental Restoration

CERCLA-driven environmental cleanup at the ORR is proceeding rapidly. Based on the Accelerated Cleanup Plan, most remedial action is focused within ORNL's Melton Valley Watershed and at ETTP. However, other activities continue throughout the ORR.

In Melton Valley, capping of Solid Waste Storage Areas (SWSAs) 4, 6, and 7 is complete. The SWSA 5 cap should be completed by September 2006. In addition, several buildings have been removed, monitoring wells have been plugged, and contaminated soils have been excavated and disposed. Transuranic (TRU) waste from the 22 trenches that have been excavated in the SWSA 5 North portion of Melton Valley will be treated and disposed of off site.

At ETTP's Zone 1 (which contains property along the Clinch River, including the former power plant area), the Blair Road Quarry remedial action was completed, scrap removal began at the K-770 Scrapyard, and dynamic verification continued in the zone's outlying area. The Zone 2 Record of Decision (ROD) was signed in April 2005 and focuses on contaminated soil, buried waste, and subsurface structures in the main plant area of ETTP. Field work is ongoing to support a sitewide ROD for groundwater, surface water, sediment, and ecological risk due to soil exposure.

DYNAMIC VERIFICATION

Dynamic Verification is a systematic method of testing to be sure that an area has been properly decontaminated or cleaned up, using real-time measurements as work is completed.

In Bethel Valley at ORNL, sampling was completed for a groundwater engineering study. Results were evaluated and published in an engineering report, which identified soil areas within the watershed that need remediation.

At Y-12, a ROD for interim actions addressing contaminated soil and sediment at Upper East Fork Poplar Creek was signed in May 2006.

3.1.2 Accelerated Cleanup Plan

The Oak Ridge Accelerated Cleanup Plan, which was agreed upon by the state, DOE, and EPA in June 2002, is now under way. The plan shortened cleanup times throughout the reservation, with disposal of all low-level legacy waste to be finished in 2005, interim cleanup of Melton Valley to be completed in 2006, and cleanup at ETTP to be complete in 2009 (extended from the original 2008 goal). The plan was put in place primarily to reduce long-term cost and to expedite remediation of the most contaminated sites on the ORR.

3.0 Environmental Management

Much progress has been made after 4 years of work. DOE met the goal for disposal of its legacy low-level radioactive waste (LLW). Only minor legacy LLW streams with no disposition pathways remain on the ORR, and DOE is actively working to find facilities to treat and dispose of these "orphan" wastes.

The Melton Valley portion of the plan was completed in September 2006 as planned, and the ETTP closure project is also well under way. However, due to the overall complexity of the ETTP project and cuts to DOE's Oak Ridge environmental management budget, the project is now projected to be approximately a year behind schedule. At this time, the state sees no major problems that would preclude the successful completion of the remedial action portion of the Accelerated Cleanup Plan.

Melton Valley Interim Record of Decision. The Melton Valley Interim ROD includes most of the sites grouped in the Melton Valley portion of White Oak Creek Watershed and a few projects from Bethel Valley (Section 3.2).

East Tennessee Technology Park Closure Project. The ETTP Closure Project concentrates on extensive decontamination and decommissioning (D&D) of the massive gaseous diffusion buildings and their support facilities, allowing cleanup of underlying soils. All actions under the ETTP Watershed (Section 3.4) are part of this project.

Balance of Program. The Balance of Program includes remediation at Y-12 (see Section 3.3), which encompasses both the Upper East Fork Poplar Creek and Bear Creek Valley watersheds. It also includes actions at ORNL in the Bethel Valley portion of White Oak Creek Watershed (Section 3.2.1), off-site closures at sites in Oak Ridge and Knoxville, and waste management activities (Section 3.5).

3.2 OAK RIDGE NATIONAL LABORATORY

3.2.1 White Oak Creek Watershed–Bethel Valley

The 800-acre Bethel Valley Watershed contains the main plant area of ORNL. The watershed is bounded to the south by the White Oak Creek Watershed–Melton Valley and to the north by the Bear Creek Valley Watershed.

This watershed contains the area previously known as Waste Area Grouping 1: industrial buildings, laboratories, research reactors, and support facilities such as tank systems, pipelines, and other ancillary equipment. The wastes located in the Bethel Valley portion of the watershed came from operations such as the following:

- Nuclear reactors;
- Radioisotope operations;
- Particle accelerators;
- Hot cell operations;
- Physical, chemical, and biological research;
- Fuel chemical reprocessing research; and
- Analytical laboratories.

Bethel Valley Watershed also contains the Waste Area Grouping 3 burial grounds to the west and the Waste Area Grouping 17 shop area. Waste Area Groupings 3 and 17 are not as seriously contaminated as other areas but still must be closed out.

Bethel Valley Interim Record of Decision. The Bethel Valley Interim ROD covers cleanup of surface water, soils, buildings, and contaminated source areas while deferring decisions on groundwater. It was completed and signed by the FFA parties (DOE, EPA, and the state) in May 2002. The signing was a milestone and began several years of CERCLA remediation within the Bethel Valley Watershed.

Molten Salt Reactor Experiment. The Molten Salt Reactor Experiment (MSRE) operated from 1965 to 1969, after which it was mothballed. Remediation and closure of the MSRE facility began in late FY 1994 and is still under way. This activity, authorized under a CERCLA ROD, involves the removal and disposition of reactor fuels (solidified salts of beryllium fluoride, lithium fluoride, zirconium fluoride, uranium fluoride, and trace quantities of other fluoride compounds). This material is currently scheduled for removal by the end of FY 2007.

TDEC photo

The Hot Storage Garden at ORNL has been stabilized. The Radiological Monitoring and Oversight program conducted several site visits during remediation.

The division's Environmental Restoration and Radiological Monitoring and Oversight programs oversee MSRE activities. Their status as of FY 2006 is as follows.

Reactive Gas Removal. The Reactive Gas Removal System became operational in FY 1997. DOE initiated this action to purge uranium hexafluoride (UF_6) and fluorine gas from the off-gas piping system. To date, the Reactive Gas Removal System has removed more than 23 kilograms of the MSRE uranium in the form of UF_6. It will remain operational for the duration of the MSRE remediation project. Only very small amounts of UF_6 were removed from the system during FY 2006.

Uranium Deposit Removal. The uranium deposit—containing approximately 2.7 kilograms of uranium-233—was removed from the auxiliary charcoal filter bed in FY 2001. The removal action report for this activity was completed and approved in FY 2002. The uranium-embedded charcoal deposit is currently being stored in a safe-geometry configuration in a shielded canister on top of the MSRE reactor shield blocks in the reactor high bay.

Fuel and Flush Salt Removal. In this remedial action, uranium is separated and removed from the fuel and flush salts in the drain tanks and stored as part of the uranium-233 inventory. The fuel and flush salts are later removed from the drain tanks and placed in stable storage. Fuel and flush salt removal began in FY 2005 and is

scheduled for completion in FY 2007. Following fluorination for removal of the uranium as UF_6, the uranium-233 will be placed in interim storage at ORNL Building 3019 and dispositioned with the rest of the uranium-233 material. An MSRE Phased Construction Completion Report is planned for completion in FY 2007.

ORNL Corehole 8 Source Removal. This site has a plume of groundwater contaminated with strontium-90. The contamination can be traced back to highly contaminated soils and a leaking liquid LLW tank located in the main ORNL plant area. DOE excavated approximately 90 percent of the contaminated soil around leaking underground waste tank W-1A. The excavation was discontinued when workers encountered higher-than-anticipated levels of TRU radionuclides. The state and EPA are allowing DOE to revise plans for the excavation and disposal of this high-risk contamination. DOE has agreed to resume and complete this removal activity in FY 2008. Sampling of the remaining soil in the excavation area has begun.

Spallation Neutron Source. The Spallation Neutron Source is an accelerator-based research facility located on a 75-acre site on Chestnut Ridge between ORNL and Y-12. On April 28, 2006, the $1.4 billion Spallation Neutron Source produced neutrons for the first time. The seven-year project was formally completed after months of testing on May 31, 2006. By around 2007–2008, the Spallation Neutron Source is expected to generate the most intense neutron flux of any facility in the world. The current long-term goal of the Spallation Neutron Source is to produce neutrons at a 1.4 MW power level. The Spallation Neutron Source briefly reached an operating level of 60 kW in 2006

DOE photo

The Spallation Neutron Source at ORNL is shown, with the accelerator in the background, target building in the center, and support facilities in the foreground.

The division attends semiannual DOE review sessions, has periodic meetings with Spallation Neutron Source staff members, makes site visits (including inspections of erosion and sediment controls), and reviews environmental plans and related documents.

3.2.2 White Oak Creek Watershed–Melton Valley

The Melton Valley Watershed occupies about 1,000 acres of land south of and downstream of the Bethel Valley Watershed. Haw Ridge separates Melton Valley from Bethel Valley, and the Clinch River borders Melton Valley on the west.

3.0 Environmental Management

Melton Valley contains many acres of burial grounds, seepage pits, contaminated floodplains, and hydrofracture wastes, but the majority of disposal activities involved the use of shallow land burial. The wastes located in this watershed originated not only from local operations, but from other sites as well. Beginning in the mid-1950s, the Atomic Energy Commission designated ORNL's solid waste storage areas as the Southern Regional Burial Grounds. From 1955 to 1963, various off-site installations sent about 10 million cubic feet of solid waste containing radioactive and hazardous substances to be disposed in this area.

BJC photo

This aerial photograph taken in April 2004 shows SWSA 6 before remediation.

The Melton Valley Watershed has many problem contaminants, some of which are discharging into the Clinch River via White Oak Creek. These include cesium-137, cobalt-60, strontium-90, tritium, other radionuclides, TRU elements, and volatile organic compounds (VOCs).

Melton Valley Watershed Interim Record of Decision. The Melton Valley Interim ROD was completed and signed by the FFA parties in September 2000. This CERCLA decision combines many independent subunits—or operable units—that involve soil excavations, the capping of waste disposal sites, demolition of old facilities, and the plugging and abandonment of numerous monitoring and hydrofracture wells. Remedial actions to be performed under this ROD are scheduled under the Accelerated Cleanup Plan to be completed in FY 2006. Several of the initial activities under this ROD were completed this past year, and new activities continue.

Hydrologic Isolation. The Melton Valley Interim ROD includes the installation of multi-layer caps on areas that have been used to bury radioactive waste over the past half century. During FY 2006, DOE completed cap installation on SWSA 4 and SWSA 7. The installation of caps on SWSA 5 and SWSA 6 should be completed in September 2006. Shallow groundwater diversion and collection trenches are also being installed in the capped areas.

Soils and Sediments. DOE continued walkover surveys in Melton Valley during FY 2006. The project has identified locations where soil contamination may exceed the cleanup criteria described in the ROD. Some of these areas include leak sites from inactive pipelines, soils in the immediate vicinity of inactive settling ponds, and soils under equipment storage areas. This project is to be completed in September 2006.

New Hydrofracture Facility D&D. This project, part of the Melton Valley Interim ROD, involves D&D of the New Hydrofracture Facility building and support systems. In 2004, an off-site contamination spill of project waste on Highway 95 delayed this project for several months. Demolition of the facility should be complete by September 2006. Contaminated waste from this project is planned for disposal at the Environmental Management Waste Management Facility (EMWMF) in Bear Creek Valley.

Plugging of Abandoned Monitoring Wells. The 111 wells at the four hydrofracture sites in Melton Valley were plugged and abandoned in 2003 and 2004.

High Flux Isotope Reactor and Radiochemical Engineering and Development Center. The High Flux Isotope Reactor (HFIR) and Radiochemical Engineering and Development Center (REDC) are active facilities used for research into the effects of neutron interaction with various materials and for the production of medical and industrial isotopes. Targets that have been irradiated at HFIR are sent to REDC for isotope separation and subsequent packaging for shipment to the end user.

In the spring of 2001, the division formed a HFIR/REDC Review Team to increase state oversight of the facilities. The division also performs periodic reviews of National Pollutant Discharge Elimination System (NPDES) and radiological discharges at HFIR.

3.3 Y-12 NATIONAL SECURITY COMPLEX

3.3.1 Upper East Fork Poplar Creek Watershed

Located between Pine Ridge and Chestnut Ridge, the Upper East Fork Poplar Creek Watershed includes the main Y-12 complex and its surrounding area. This watershed lies to the east of the Bear Creek Valley Watershed and has more than 70 known sources of contamination.

A groundwater plume contaminated with nitrates, uranium-238, and other radionuclides and metals underlies the central complex area. This plume originates from the S-3 Ponds (on the divide with Bear Creek Valley Watershed) and from other sources within the complex.

Upper East Fork Poplar Creek Phase I Interim ROD. The Phase I ROD, signed in May 2002, focuses on preventing contamination from moving away from source areas and on cleaning up concentrations of contamination. This strategy includes a variety of measures:

- Installing asphalt caps over mercury runoff areas,
- Flushing contaminated sediment from storm sewers,
- Relining or replacing storm sewers as needed in the west end mercury area,
- Building mercury treatment facilities,

- Removing contaminated sediments in Upper East Fork Poplar Creek and Lake Reality,
- Monitoring, and
- Land-use controls.

Later RODs will address additional contaminated soils and sediments, D&D of buildings, and groundwater.

ROD for Phase II Interim Actions for Contaminated Soils and Scrapyard in Upper East Fork Poplar Creek. A ROD for interim actions focusing on contaminated soils and the scrapyard has been signed by the regulators. Actions from this ROD are scheduled for after 2008.

3.3.2 Bear Creek Valley Watershed

Bear Creek Valley begins at a low divide west of Y-12. The watershed historically was used for disposing of wastes generated by nuclear-weapons manufacturing at the plant. The primary waste streams were machining remnants of metallic uranium, solvents, nitrates, shock-sensitive and explosive chemicals, and contaminated tools and equipment. These wastes were buried in pits, poured into holding ponds, and burned. Bear Creek Valley now hosts a state-of-the-art CERCLA disposal facility—the Environmental Management Waste Management Facility (EMWMF)—for waste created by cleanup on the ORR.

The Bear Creek Valley Watershed was used for disposing of wastes generated by nuclear-weapons manufacturing at Y-12.

3.4 EAST TENNESSEE TECHNOLOGY PARK WATERSHED

The ETTP Watershed occupies 4,600 acres, only about 1,000 of which have been affected by operations at the former K-25 site. The watershed is partially bordered on the west by the Clinch River, and its tributary Poplar Creek runs through the area.

Principal contaminants in the groundwater are VOCs, some radionuclides, and various types of metals. The most pervasive contaminants are trichloroethylene and technetium-99. Surface water contamination is not a major problem.

Various types of contamination can be found in both shallow and deep soils. Shallow soils contain radionuclides, metals, and organics that can be traced back to spills, overflows, building runoff, and atmospheric releases. Petroleum products, VOCs, and some radionuclides are found in the deeper soils. This contamination is the result of disposal via septic systems, waste-line and tank leaks, and leaching from burial grounds.

Zone 1. Zone 1 consists of areas outside of the main plant site (including Duct Island, the K-770 area, the Powerhouse area, ED-3, the Contractors Spoil area, and Blair Road Quarry). Because few buildings and facilities currently exist in this section of ETTP, Zone 1 is considered to be the area easiest to remediate. Work in Zone 1 will help define the process for remediation of the main plant area. The ROD for Zone 1, signed in November 2002, specifies remediation to unrestricted industrial land use standards. The FFA parties have finalized much of the post-ROD documentation, such as waste handling plans and remedial designs. Dynamic verification is nearly complete in the Zone 1 area.

Because few buildings and facilities currently exist in Zone 1, it is considered the area easiest to remediate.

At the Blair Road Quarry, remedial action to remove the contaminated soil began in November 2004 and was completed in early January 2005. More than 15,000 tons of soil contaminated with polyaromatic hydrocarbons was transported to the EMWMF. Work to remove scrap from the K-770 Scrapyard has been ongoing. The scrap metal must be removed before the underlying soils can be characterized and remediated. Three casks containing a large inventory of cesium-137 and other radionuclides were discovered during the scrapyard cleanup. The casks were moved to ORNL for characterization in hot cell facilities. Under the accelerated schedule, work is to be completed on the Zone 1 area and across the entire ETTP site by FY 2008.

Zone 2. Zone 2 is the approximately 800 acres that make up the main industrial plant area of ETTP. This area contains administration, laboratory, process, and support facilities as well as waste burial areas and scattered areas of ecological habitat. A ROD signed in April 2005 covers remediation of contaminated soils, buried waste, and subsurface structures. It is aimed at making way for ETTP's ultimate use as a commercial/industrial park with limited DOE obligations. Most Zone 2 facilities are going through D&D separately, with a limited number of buildings being transferred to the Community Reuse Organization of East Tennessee. Post-ROD documentation to implement the selected remedies is being prepared for submittal to the FFA parties.

ETTP Sitewide Record of Decision. The sitewide ROD encompasses both Zone 1 and Zone 2 and focuses on human health and ecological protection from surface water bodies, ecological protection from surface soil, and human health protection from groundwater. The primary remedial actions in Zones 1 and 2 are removal of contamination sources in the soils. Several Data Quality Objective workshops were held in 2004, culminating in an approved remedial investigation work plan later in the year. The field work laid out in this plan was completed in May 2005. The Remedial Investigation and Feasibility Study for this ROD will be completed in the summer of 2006.

K-29, K-31, and K-33 Decommissioning and Decontamination. In August 1997, DOE signed a contract with British Nuclear Fuels LLC for the D&D of three enormous gaseous diffusion process buildings: K-29, K-31, and K-33.

3.0 Environmental Management

After British Nuclear Fuels completed its contract, disposition of the three buildings was turned over to environmental contractor Bechtel Jacobs Company LLC (BJC). As of the end of FY 2006, the demolition of Building K-29 is nearly complete. Most of the work in Buildings K-31 and K-33 has been completed, and the buildings are available for reuse by a major industry. Final status surveys are being conducted in the two buildings. The cleanup and decontamination levels remaining in the buildings were designed to keep the total radiological dose to an industrial worker at less than 5 millirem (mrem)/year.

As a result of this project, more than 196 million pounds of LLW have been removed and sent for disposal to Envirocare, more than 34 million pounds of waste have been shipped for disposal to the Nevada Test Site, and more than 41 million pounds of LLW have been sent for on-site disposal at EMWMF and the Y-12 Landfill.

Buildings K-31 and K-33 are available for reuse by a major industry.

The division has been overseeing this project since it began. As of the end of June 2006, 99 percent of the project had been completed. A Removal Action Report was submitted to the FFA parties in February 2006.

D&D of ETTP Building K-1200. Project contractor East Tennessee Materials and Energy Corporation has finished removing all former uranium processing equipment and classified materials from the center and south bays of this building. Additionally, all transferable radioactive and classified contamination within the building has been removed. All D&D-related work has been completed. The company plans to use a portion of the building for storage of hazardous/classified materials in support of its DOE/commercial waste treatment operations.

D&D of ETTP Building K-1420. The D&D of building K-1420 began in FY 1999 at a projected cost of $10 million. As of May 2000, the projected cost was $12 million, and the projected completion date was early 2001. However, in December 2000 a contract dispute resulted in a suspension of all work on this project. At the time of suspension, the project was approximately 90 percent complete. Following negotiations with the contractor's bonding company last year, all contract-related work has been completed, including final disposition of contract-related waste as of June 30, 2006.

K-25/K-27 D&D. D&D activities for the K-25 and K-27 gaseous diffusion process buildings at ETTP are being accomplished under CERCLA. To facilitate completion of ETTP closure by FY 2009, this project has been assigned a high priority within the Accelerated Cleanup Plan. The buildings have been permanently shut down since 1964. Because the K-25 facility is the original gaseous diffusion plant that began operating in 1945 and is recognized as a Manhattan Project Signature Facility, there is much interest in maintaining the North Tower at the bottom of the "U" to commemorate its historic significance.

3.0 Environmental Management

D&D activities will take place in three major phases:

- Removal of hazardous materials such as asbestos and mercury switches,
- Removal of process equipment, and
- Demolition of the building structures.

As of June 2006 all three phases of activity were under way in Building K-25, with phase 1 abatement activities close to completion, although asbestos will continue to be removed during phases 2 and 3. Some process equipment and excess materials have also been removed from the building. Demolition of the facility structure started in October 2004. Removed material is being disposed primarily at the EMWMF. According to present schedules, this project will be completed by FY 2009.

Group II Buildings D&D. Group II Buildings D&D includes demolition of all buildings at ETTP scheduled for demolition but not covered by another project. One generic engineering evaluation/cost analysis was done to streamline the required documentation for the facilities. Based on facility prioritization, subsequent action memoranda serve as the decision documentation for the specific groupings of facilities that are to be demolished.

The main plant demolition project covered 10 facilities and was completed in January 2004. The K-1064 demolition project covered 18 facilities and is nearing completion. The Remaining Facilities D&D covers the approximately 500 facilities remaining at ETTP, including K-29, K-1401, K-1420, the Poplar Creek facilities, and equipment from the centrifuge facilities. According to present schedules, the project will be completed by FY 2009.

DOE once stored approximately 7,000 cylinders of depleted UF_6 or its remnants at ETTP.

Uranium Hexafluoride Cylinders. DOE once stored approximately 7,000 cylinders of depleted UF_6 or its remnants at ETTP in several storage yards. The division's Radiological Monitoring and Oversight program monitored UF_6 management. Division staff reviewed quarterly reports, occurrence reports, and information from the cylinder information database and made site visits to observe cylinder yard activities. The division also monitored radiation dose rates at UF_6 cylinder storage yards.

As of the final draft of this report, all cylinders from the ETTP storage yards were transported to DOE's Portsmouth Gaseous Diffusion Plant for conversion to a more stable form. Division staff had previously reviewed transportation plans for shipping both American National Standards Institute N14.1-compliant cylinders and noncompliant cylinders. Division staff participated in conference calls with agencies in the affected states and reviewed the progress of cylinder removal at ETTP.

TSCA Incinerator. This incinerator is designed to treat mixed waste (containing both radioactive and hazardous contamination) and PCBs. It holds the distinction of being the

only incinerator in the United States permitted to treat all these waste types. In FY 2006, the TSCA Incinerator treated 591,016 pounds of wastes. In support of accelerated cleanup plans across the entire DOE complex, the current strategy is for the incinerator to remain operational until 2009.

The division's Waste Management Program monitored incinerator operations in FY 2006. During the year, the state approved two modifications to the incinerator's FY 2004 Burn Plan, followed with conditional approval of the FY 2005 Burn Plan. Before out-of-state waste is shipped to the TSCA Incinerator, the division performs a detailed review of waste characterization data. The review also focuses on whether incineration is the only treatment option for those out-of-state waste streams. The incinerator once again operated during FY 2006 in compliance with its permits.

Before out-of-state waste is shipped to the TSCA Incinerator, the division performs a detailed review of waste characterization data.

The incinerator operators performed comprehensive performance tests in March 2005 to demonstrate compliance with Maximum Achievable Control Technology parameters, which went into effect on September 30, 2003. Changes in some emissions limits were allowed under a construction permit.

A detailed facility-specific risk assessment will be performed as part of the RCRA permit renewal currently under way. The purpose of the RCRA risk assessment is to evaluate potential human health and ecological risks posed by non-radiological emissions from the incinerator. The state is currently reviewing the compliance performance test data and plans to request public comment on the outcome. Once results are evaluated for the Comprehensive Performance Tests, the more restrictive of either RCRA or Maximum Achievable Control Technology provisions for individual parameters will be incorporated in the risk analysis that needs to be approved prior to issuance of air and RCRA permits.

3.5 WASTE MANAGEMENT

3.5.1 Oak Ridge Environmental Management Waste Management Facility

Also known as the CERCLA waste disposal facility, the EMWMF was built to dispose of the large volumes of contaminated waste generated by remedial actions on the ORR, a formidable and expensive disposal problem. Historically, there were only two options for this waste: Package and ship it to out-of-state locations or delay cleanup and leave the waste in the environment.

The option of leaving contamination in place is not acceptable for most sites, especially those with future uses or those that may be sources of groundwater contamination. On the other hand, shipping the vast quantities of contaminated soil and

debris to disposal sites in the western United States is prohibitively expensive. The ORR long needed a properly engineered and constructed on-site waste disposal facility.

DOE, EPA, members of the public, and the state—through the division's Environmental Restoration Program—took part in the planning and decision-making that authorized the facility. The EMWMF is now up and operating and has received waste from several projects on the ORR.

TDEC photo

The division sampled runoff from EMWMF to test for the presence of contamination.

Because of the nature of the contaminants being disposed, the EMWMF will have to be maintained essentially forever. In order to help in this endeavor and to ensure surveillance and general maintenance, Tennessee has established a trust fund to which DOE makes annual allotments. The state plans to use revenue generated from the fund to provide surveillance and maintenance after final closure of the EMWMF. It should be recognized, however, that this fund will not cover all expenses necessary in the long term to ensure this facility does not endanger human health and the environment. The federal government will remain responsible for assuring this protectiveness as long as EMWMF contents remain a potential hazard.

The division has been active in environmental oversight of the EMWMF. Staff participated in the core team during the design and construction of several projects. Higher-than-expected groundwater levels under Cells 2 and 3 necessitated a groundwater suppression system, and design and construction of Cells 3 and 4 were completed. The division will continue to provide environmental oversight of this facility, which is a high priority for the state.

3.5.2 Solid Waste

The division, through its Waste Management Program, works to ensure that DOE adheres to provisions of RCRA (See Environmental Laws sidebar in Section 2.0) and to the rules and regulations governing solid waste disposal in Tennessee.

Oak Ridge Reservation Landfills. The principal process performed at the ORR landfills at Y-12 is the disposal of solid wastes, which must be non-hazardous, non-radioactive, and non-RCRA-regulated. DOE must use approved operations in receiving, compacting, and covering waste.

The division performs a monthly audit of DOE's landfills on the ORR. It also reviews DOE practices to ensure that radioactive waste is not disposed in these landfills. In FY 2006 waste was disposed of in three ORR landfills now in use.

Industrial Landfill IV. Ninety-three cubic yards were disposed of in this approved Class II industrial waste landfill in accordance with TDEC permit No. IDL-01-103-0075. Because it was opened prior to implementation of the current Class II requirement established in the TDEC solid waste processing and disposal regulation, only the western area has a leachate collection system and gas monitoring capabilities.

Industrial Landfill V. A total of 42,021 cubic yards were disposed of in this Class II industrial landfill permitted under TDEC permit No. IDL 01-103-0083. The landfill receives sanitary and industrial waste generated at the plants, as well as special waste approved by TDEC. This landfill has a leachate collection system.

Construction/Demolition Landfill VII. A total of 95,320 cubic yards were disposed of in this Class IV landfill permitted under TDEC permit No. DML-01-103-0045. This landfill is used for the disposal of demolition/construction waste and certain other TDEC-approved waste having similar characteristics.

3.5.3 Hazardous Waste Management

In FY 2006, the division participated in hazardous waste compliance evaluation inspections at ORNL, Y-12, and ETTP under the August 13, 2003, Low-Level Waste Management Agreement between the state and DOE. As a result of these inspections, notices of violation were issued to ORNL and ETTP.

The problems at ORNL were discovered during a May 15–17, 2006, hazardous waste inspection. They included improper labeling of two containers of "Used Oil" in Building 7002 (garage facility), improper labeling of a waste drum in Building 7005 (lead shop), and storage of two containers of LLW in violation of the Legacy Low Level Waste Management Agreement dated August, 13, 2003.

The RCRA inspection at ETTP took place the week of February 13, 2006. Six violations were cited in the Notice of Violation letter sent to DOE on April 18, 2006:

- Failure to provide accumulation start dates and hazardous waste labels for 16 containers in Building 1065 E;
- Failure to close one hazardous waste container in Building 1065-D;
- Storage of hazardous waste in excess of 1 year with an unacceptable burden of proof statement;
- Violation of the conditions of the Legacy Low Level Waste Management Agreement of August 13, 2003;
- Improper labeling of universal waste and storage of that waste in excess of 1 year; and
- Storage of containers generated by decanting operations for more than 1 year.

3.5.4 Radioactive Waste Management

Low-Level Radioactive Waste. Under the Accelerated Cleanup Plan, DOE was to have disposed of all legacy LLW by the end of FY 2005. "Legacy waste" refers to waste that was in DOE's Environmental Management program inventories before September 30, 2000. As part of this effort, DOE began characterizing (including sorting and segregating) the legacy waste that had accumulated on the ORR. By June 2006, this effort had resulted in the disposal of most of the more than 32,000 cubic meters of this waste. However, legacy low-level waste streams with no treatment capacity or technology remain on the ORR. In addition, the scheduled disposal of a small portion of the legacy LLW has been delayed to the beginning of FY 2007.

"Grandfathered waste" is a special category of legacy LLW at the Y-12 National Security Complex. Grandfathered waste was certified to earlier waste handling requirements and must be further characterized and sorted to meet waste acceptance criteria at disposal facilities. The Environmental Management program set a deadline for acceptance of grandfathered waste and accepted no additional grandfathered waste after FY 2004. Some of the 3,282 cubic meters of National Nuclear Security Administration (NNSA) grandfathered waste remaining at Y-12 has been incorporated in a security barrier around the exclusion area of the plant. The waste in this barrier will not be dispositioned until a new protected area currently under construction is up and running. The target date for the protected area to be fully operational is 2010. The remainder of the NNSA grandfathered waste will be dispositioned as funds become available. Because of the high cost of characterization and sorting/segregating operations, current funding will not be enough to significantly reduce the storage of grandfathered waste. DOE must find an administrative pathway for the characterization and disposition of Y-12's legacy LLW.

Grandfathered waste was certified to earlier waste handling requirements and must be further characterized and sorted to meet waste acceptance criteria.

Spent Nuclear Fuel. The division, represented by the Radiological Monitoring and Oversight Program, has over the years monitored all spent nuclear fuel issues, including inventory, storage, retrieval from below-grade storage, repackaging for shipping, shipping-cask inspection, and all other transportation issues related to spent nuclear fuel shipping. All the spent nuclear fuel on the ORR was housed at ORNL, and nearly all remaining stored spent nuclear fuel has been shipped off site. The HFIR is still in operation, and spent fuel is stored on site. Gram quantities of spent nuclear fuel are used at the REDC for research purposes.

Removal of the MSRE fuel salts has been stalled by a fluorine release and the subsequent need for corrective actions. The separated uranium is to be stored in ORNL Building 3019 and will be dispositioned with the rest of the uranium-233 material. The

MSRE fuel salts will be stored at the ORNL TRU storage facility at SWSA 5 until a final disposal location is chosen.

No HFIR spent nuclear fuel is expected to be shipped until FY 2008, as the project's budget has been used for cold source upgrades. The reactor is expected to restart in May 2007. The reactor's storage pool contains 80 racks for fuel storage, and 55 of these are filled.

3.5.5 Mixed Waste Site Treatment Plan

The Site Treatment Plan is a mixed-waste management tool authorized through the Federal Facility Compliance Act (see "Environmental Laws" sidebar in Section 2.0). Mixed wastes have both hazardous and radiological constituents. The Site Treatment Plan is implemented through a TDEC Commissioner's Order because the state regulates the hazardous constituents. This enforceability has usually resulted in an effective work-off of inventories according to negotiated schedules.

TRU radioactive wastes have only one disposal option: the Waste Isolation Pilot Plant in New Mexico. DOE's inability to obtain a RCRA permit modification from the state of New Mexico has resulted in delays in the proposed treatment schedule for the ORR's TRU waste. DOE is continuing to challenge the appropriateness of the TRU milestones in the Site Treatment Plan. In FY 2003, the dispute resolution was escalated to a "Formal Status," allowing the dialogue to take place at the TDEC Commissioner's level.

TRU radioactive wastes have only one disposal option: the Waste Isolation Pilot Plant in New Mexico.

In September 2004, DOE requested an extension of a milestone for certain wastes listed in Table 3.4 in the Site Treatment Plan, citing national treatment capacity issues for its inability to ship waste for treatment and disposal. The state rejected the request for extension, noting that lack of adequate characterization is the principal issue. Currently, DOE is continuing to ship these wastes for treatment and disposal. The effort includes characterization as well as designation of some wastes for treatment at the TSCA Incinerator. In FY 2006, DOE shipped about 310,000 pounds of these wastes for treatment and/or disposal; as of June 30, 2006, nearly 290,000 pounds of these wastes remain on the ORR.

3.5.6 Facility Surveys

Five decades of nuclear weapons research and development on the ORR has left a legacy of contamination in the local and regional environment, including land and water ecosystems. Most of this radiological and chemical contamination was released directly from buildings and other facilities.

3.0 Environmental Management

In an effort to document the nature and sources of contamination, the division's Radiological Monitoring and Oversight Program conducts a Facility Survey Program. The Facility Survey Program documents the following for facilities:

- Operational history,
- Physical condition,
- Past release history,
- Radioactive and chemical inventories, and
- Potential for ongoing and future releases.

The Facility Survey Program also tracks demolition and construction activities on all three sites.

As facilities are examined, they are ranked according to their potential to harm the environment. Since 1994, the Facility Survey Program has examined 176 facilities, 64 of which held a high potential for environmental impact.

In many cases, the potential for environmental release is dominated by degraded or poorly maintained facilities and infrastructure, such as underground waste lines, substandard sumps and tanks, leaky roofs, and peeling lead-based paints. When facility problems are noted by the Facility Survey Program, they are relayed to DOE, where corrective actions can be formulated. As corrective actions are completed, facilities are removed from the division's list of facilities with a high potential for environmental release. To date, 19 facilities have been removed.

TDEC photo

ORNL's Building 1000 was demolished in FY 2006.

Beginning in 2002, facility survey staff began refocusing their primary effort on the oversight of facilities slated for D&D and demolition at ORNL and Y-12. This activity was in response to formal, accelerated infrastructure reduction (demolition) programs at both sites. Staff completed organized document reviews and field oversight of all activities related to facility demolition. During 2005, staff made 380 field visits before and during the demolition of 27 facilities.

3.5.7 Verification of Surplus Materials Release

Division staff review radiological control procedures and ensure that DOE and its contractors follow agreed policies for release of materials to the public. Under this activity, staff from the Radiological Monitoring and Oversight Program review

occurrence reports when radioactively contaminated materials are inadvertently released. In addition, staff members check public auctions for adherence to release policies and conduct spot radiological surveys. Surveys of public auction items were conducted for 13 public auctions by Y-12 Surplus Sales and ORNL Surplus Sales. ETTP did not schedule any public auctions during this fiscal year. In the 13 inspections conducted, four items were identified as needing further evaluation. One item required modification of a radiological release tag, and three items were evaluated for radiological contamination due to elevated readings recorded during the radiological survey. As a result of the inspections, two items were removed from the inventory to be released.

Scrap metal is also monitored under this program. Clean scrap metal is sold under annual sales contracts at ORNL and Y-12. At ETTP there is currently no routine disposition of clean metal. Previously, staff reviewed the scrap metal sales programs at ORNL, Y-12, and ETTP. Procedures for surveying and controlling the flow of clean scrap metals were reviewed.

4.0 Regional Environment

While pollutants released from the ORR have substantially decreased over the years, concerns remain that emissions from current activities could pose a threat to public health and the environment. To help ensure that emissions from the ORR are identified and properly controlled, the TOA specifies that the state shall do the following:

- Perform independent oversight and evaluation of DOE's environmental monitoring programs;
- Monitor radiation on the ORR and environs, as necessary, to detect and characterize off-site contamination and human exposure; and
- Evaluate performance of on-site control measures to prevent releases to the environment.

In response to these requirements, the division has developed programs that provide independent monitoring of all media on and in the vicinity of the ORR and oversight of DOE monitoring and control systems. Designed with the cooperation of DOE and EPA, these programs were developed to complement and verify monitoring performed by DOE's contractors.

4.1 WATER QUALITY

Activities on the ORR have contaminated more than 100 miles of surface streams and considerable (but unknown) quantities of groundwater in East Tennessee. While effluents from process waste streams contribute to this contamination, much of the pollution found in waters on the ORR can be attributed to releases from antiquated and deteriorating waste disposal, transport, and storage facilities. To a large degree, these contaminants migrate to groundwater, where they are discharged to local streams and carried to the Clinch River. While ORR contaminants are diluted by the Clinch River, evidence of them can be found downstream to Watts Bar Dam and beyond.

Each of the division's program areas has specific responsibilities that contribute to protection of the state's water resources. These responsibilities include the oversight of DOE monitoring systems, as well as independent monitoring as necessary to verify DOE data and ensure adequate protection of the public and environment.

4.1.1 Drinking Water Supplies

The division continued in FY 2006 to oversee maintenance and compliance activities for the water treatment and distribution systems serving DOE's Oak Ridge facilities. This work includes the following:

- Independent monitoring of residual chlorine levels; and
- Oversight of cross-connection controls, water line repairs, and the general status of distribution systems.

4.0 Oak Ridge Regional Environment

The division did not detect any serious threats to worker or public safety. However, given the challenges present on the ORR—including burial grounds, contaminated soils, and contaminated groundwater—evaluation of the potable water distribution systems at the three plant sites remains an ongoing need.

ORNL. The division continues to conduct oversight of routine drinking water monitoring and backflow prevention devices at ORNL. In addition, the division conducts oversight of line breaks and other anomalies in the distribution system.

Y-12. On September 7, 2005, division personnel accompanied Division of Water Supply personnel on a sanitary survey of the Y-12 water distribution system. This survey was conducted as a follow-up to the 2004 Sanitary Survey, which resulted in a Notice of Violation to Y-12 for deficiencies in its operation of the distribution system. Initial results of the review indicate that for the most part, the physical system meets or exceeds all required operating parameters. The main point of the survey was to review the Y-12 Cross Connection Control Plan and the management of backflow prevention devices. The state asked Y-12 to address four significant issues.

TDEC photo

Division staff observe repair of a major city water line at Y-12.

In March 2006, Y-12 submitted a new Cross Connection Control Plan that was subsequently approved by the Division of Water Supply.

Late in June 2006, the division learned of ongoing repair work on a 24-inch city of Oak Ridge raw water line at Y-12 (Building 1415/pump station), which brings water pumped from the Clinch River to the city water treatment plant. After a power outage at the pump station, resumption of pumping probably caused the break in the line. Since the line, formerly owned by DOE and now owned by the city, is on the ORR, the division oversees it for potential contamination issues.

ETTP. Continuing D&D activities have reduced the size of the distribution system at ETTP. Lines are being taken out of service and cut and capped as demolition work proceeds. The division continues to conduct oversight of routine drinking water monitoring and backflow prevention devices at ETTP. In addition, the division conducts oversight of line breaks and other anomalies in the distribution system.

Radiological Monitoring of Drinking Water. Since the Clinch River serves as a raw water source for public water supplies in the area, these utilities can potentially be impacted by radiological releases from the ORR. To address this possibility, the division arranged for area treatment facilities to be included in EPA's Environmental Radiation Ambient Monitoring System (ERAMS) drinking water program in 1996. Recently

renamed RadNet, the program monitors drinking water from public supplies near nuclear facilities throughout the nation. In the Oak Ridge program, EPA provides radiochemical analysis of drinking water samples collected by the division at five water supplies:

- Kingston Water Treatment Plant,
- Gallaher (K-25) Water Treatment Plant,
- West Knox Utility,
- City of Oak Ridge (Y-12) Water Treatment Facility, and
- Anderson County Utility District.

Four of these facilities are located on the Clinch River in the immediate vicinity of the reservation. The fifth, the Kingston Water Treatment Plant, is located on the Tennessee River just above its confluence with the Clinch River.

A large proportion of the radioactive contaminants transported off the ORR in surface water enter the Clinch River by way of White Oak Creek, which drains the ORNL complex and associated waste disposal areas. Since the Gallaher Water Treatment Plant is the closest water supply downstream of White Oak Creek (approximately 6.5 river miles), this facility would be expected to exhibit the highest concentrations of radioactive contaminants of the five utilities monitored in the program. Conversely, the Anderson County facility (located upstream of the reservation) would be expected to be the least vulnerable to ORR pollutants. Based on the data collected in the Oak Ridge ERAMS program, the above appears to be the case. However, results for the Gallaher facility and the other sites in the program have all remained well within applicable drinking water standards.

4.1.2 Groundwater

Eighty-five percent of the ORR has not been developed, and most of the groundwater under these areas has not been contaminated and should be protected. Groundwater in and adjacent to industrially developed areas is generally in poor condition or in danger of being degraded by expansion of contaminant plumes. Where contaminated groundwater has migrated off site, restrictions on groundwater use are placed on non-DOE land users. The Clinch River ultimately dilutes many of the groundwater discharges from springs near watercourses on DOE and Tennessee Valley Authority (TVA) property.

The levels of contaminants are low, with some exceptions near waste sites, and the general quality of groundwater on the ORR is good. The fact that contaminants can still be measured at a distance from some sources, however, emphasizes the need to protect the remaining clean groundwater on the ORR from spreading contaminant plumes.

Y-12 National Security Complex. Groundwater is contaminated beneath the Y-12 plant site, with plumes extending both east and west. Groundwater in the vicinity of Y-12 contains metals (including mercury), solvents, and uranium. A carbon tetrachloride plume extends east of Y-12 off the ORR beneath Union Valley. The groundwater plume west of Y-12 emanates from the former S-3 ponds and is joined by contaminants from

disposal areas in Bear Creek. The S-3 Ponds, which were closed with contaminants in place, produce a nitrate plume with significant amounts of uranium. Y-12's waste area in adjacent Bear Creek Valley contains uranium, PCBs, and solvents. Some of the denser liquids have sunk deep in the cavernous bedrock below the water table, where they act as secondary contamination sources. The location of the EMWMF in Bear Creek Valley has greatly expanded the types of contamination present in the valley and the monitoring requirements.

Disposal sites on Chestnut Ridge are grouped with the Y-12 hydrogeologic regime. The groundwater plume beneath Chestnut Ridge can be detected in a spring east of the ORR at the University of Tennessee Arboretum. Besides sharing the same suite of contaminants, this hydrogeologic connection has been verified with a division-conducted tracer test using fluorescent dyes.

TDEC photo

A geologist with the division documents the strike and dip of this rock outcrop. Measurements of this type are useful in estimating the movement of contaminants in groundwater.

Oak Ridge National Laboratory. ORNL has significant groundwater contamination both under the main plant site and in Melton Valley. At ORNL, radionuclides contaminate groundwater in the main building area, with strontium-90 being the major concern. Groundwater beneath the ORNL maintenance facility (7000 area) is known to contain solvents, but the character and fate of these contaminants is poorly known. Waste from ORNL operations disposed in adjacent Melton Valley includes tritium strontium-90, cesium-137, transuranics, and many other radionuclides, as well as various chemicals from experimental activities. The waste buried in Melton Valley eventually discharges into White Oak Creek and is subsequently diluted by mixing with the waters of the Clinch River. The South Campus Facility on the east end of Bethel Valley has a plume of solvents that have been detected in springs close to what is now city of Oak Ridge property. Construction and subsequent burial of these springs has forced the division's monitoring of this plume to be halted until another emergent point can be identified.

In the past, DOE undertook further significant activities on the top of Copper Ridge within the ORR boundaries. While no groundwater contamination has yet been identified, the division's Groundwater Oversight Program is planning to begin an investigative program in the first half of FY 2007.

East Tennessee Technology Park. ETTP has significant plumes of organic solvents located beneath the main plant area and at adjacent smaller sites. Although these have

not been completely mapped, it is probable that all groundwater beneath ETTP is contaminated. Uranium and technetium-99 also represent significant contaminants in ETTP groundwater. There are multiple points within the plant area where contaminated plumes discharge into surface waters; two springs are known to discharge solvent-contaminated water into Poplar Creek, and another spring, located south of the plant across Highway 61, is also contaminated. The sources and plumes reaching these distant points have yet to be characterized.

Residential Groundwater Sources. The division conducts routine residential well sampling near the ORR. Wells to be sampled are chosen if the property owner requests testing, or the division may ask permission if a well is considered to be in a hydrologically important location. Test results to date indicate that the water in these sources has not been affected by DOE operations. On rare occasions, a sample will show an insignificant amount of the radionuclide tritium. While it is thought that these rare and occasional "hits" for tritium are analytical aberrations, the programs policy has been to increase the sampling frequency when such results are seen.

Springs and Seeps. Springs and seeps are natural discharge points for groundwater and any contaminants it might be transporting. The division has monitored springs and seeps on and off the reservation since 1992 and considers spring and seep monitoring to be the cornerstone of its groundwater program. The program conducts ongoing reconnaissance to identify new springs and seeps to sample. In 2006, the division began to use side-scanning sonar to locate springs beneath the Clinch River and Poplar Creek. The division sampled or plans to sample 39 separate springs and seeps in 2006 at least once, and most of these will be sampled regularly.

Sampling of springs provides insight into how contaminants travel in groundwater. Springs in Bear Creek Valley downgradient from the Bear Creek Burial Grounds continue to be contaminated by radiochemicals, metals, nitrates, and VOCs. Several springs at ETTP, Y-12, and ORNL are contaminated as well. Across the reservation, the VOCs seem to pose the most significant threat to groundwater, consistently being found both at considerable distances from their sources and at concentrations considered to be unacceptable for drinking water.

Two off-site springs that emerge in public areas east of Y-12 are of special interest for 2006. The University of Tennessee Arboretum spring "Bootlegger" continues to test positive for contamination by VOCs. Cattail Spring in Union Valley, which consistently had a VOC signature in the past, ceased to exhibit contamination in late 2005. A groundwater pumping program at Y-12 appears to be successful in slowing the spread of this plume.

Springs on the periphery of ETTP show elevated levels of VOCs, and one shows radionuclides. These springs, located adjacent to but not within the ETTP boundary, represent significant points for monitoring the contaminated plume beneath ETTP.

At ORNL, springs in the Raccoon Creek drainage to the west of the main campus intermittently show strontium-90. No VOCs were detected west of ORNL. If and when

personnel resources become available, the division intends to locate and sample springs and seeps to the east in Bethel Valley and on and adjacent to Copper Ridge just south of Melton Valley.

The identification and sampling of Rose Bailey Spring has been significant to the division's groundwater monitoring program. Rose Bailey Spring, located approximately six miles southwest of ETTP, appears by its volume and location to represent a significant reemergence of groundwater in the region southwest of ETTP. To date, no contaminants have been identified in the waters of this spring. However, this location is considered to be a key point for identifying any site impacts or for demonstrating that contaminants have not had a regional impact.

TDEC photo

One of many springs on the ORR that is monitored to ensure the health of the groundwater.

Plugging and Abandonment of Wells. There are more than 4,000 monitoring wells and borings on the ORR. This project consists of requesting and reviewing data on ORR wells that will be—or have been—plugged and abandoned. With the exception of RCRA and underground storage tank regulations, the state has no specific regulations concerning the plugging and abandonment of monitoring wells unless it can be demonstrated that the wells are contributing to pollution. The Division has not reviewed any reports of plugging and abandonment activity during the last fiscal year.

Underground Storage Tanks. The division conducts oversight of the underground storage tank program on the ORR. In FY 2006, the division tracked sites that have been integrated into the CERCLA cleanup program, specifically the East End Fuel Station at Y-12. Also, the division assisted the Environmental Restoration Program by answering inquiries from DOE concerning abandoned, non-regulated underground storage tanks at ETTP.

Groundwater Strategy. DOE has drafting a strategy to address remediation of the groundwater plumes. The following general topic areas for a strategy are being addressed: problem formulation, uncertainty management, technology choices and performance objectives, and stewardship.

The division would like to see the conceptual model of ORR groundwater updated to include the complexities of the geology. Aquifers in soluble carbonate rocks are widespread on the ORR. These areas have springs, sinkholes, caves, and crevices that collectively are termed "karst." Karst aquifers transmit contaminants rapidly and unpredictably, making it difficult to investigate and clean up groundwater. The flow of groundwater within the fractured clastic rocks that underlie the remainder of the reservation (shale, mudstones, siltstones, partly carbonates) is also complex and chaotic; it should be reevaluated to reflect the fact that there is a relatively deep and rapid flow of groundwater and associated contaminants in this region, although on a more specific and limited basis. Such flow regimes in the clastic rocks may occur adjacent to relatively impermeable zones, further complicating attempts to understand and predict contaminant behavior in the subsurface.

4.1.3 Surface Water

Surface Water Sampling. The division's Environmental Monitoring and Compliance Program sampled surface water at 25 sites in FY 2006. Twenty-one of these were chosen to detect contamination from DOE. The other four are located upstream from the ORR and provide background data.

The sites were sampled twice in FY 2006, and results will be published in the April 2007 Annual Monitoring Report, which is available to the public. Samples were analyzed, and the results were compared with Tennessee Water Quality Criteria, a state water quality standard published by TDEC and based on the Clean Water Act. The division has not observed substantial concentrations of pollutants coming from the reservation.

Although the state has found that White Oak Creek is not supporting its designated uses under the Water Quality Criteria, the creek does not alter the designated use of the Clinch River. This is because the much larger flow of the Clinch dilutes contamination from White Oak Creek.

The Division of Water Pollution Control continues to post the lower section of East Fork Poplar Creek with a bacteriological advisory mandating no water contact.

Bacteria Levels of East Fork Poplar Creek. The Division of Water Pollution Control continues to post the lower section of East Fork Poplar Creek with a bacteriological advisory mandating no water contact. Although in recent years the Y-12 National Security Complex has upgraded its sanitary wastewater system, public health concerns remained that effluent from Y-12 might impact surface water bacteriological levels in the creek.

From July 19, 2005, to August 17, 2005 DOE Oak Ridge personnel collected water samples from nine sites along East Fork Poplar Creek and one along an East Fork Poplar Creek tributary. With respect to E. coli, all nine sampling sites

located directly on lower East Fork Poplar Creek were in compliance with Tennessee General Water Criteria for recreational use of surface water.

The sampling campaign was conducted during hot and dry weather conditions and alone does not substantiate a decision to discontinue the bacteriological advisory. Sampling results both for E. coli and enterococci suggest that, relative to other locations on or near lower East Fork Poplar Creek, the Y-12 plant is not a significant source of fecal contamination levels in the creek. However, the sampling results for enterococci indicate a need to identify and remedy the sources of bacterial contamination. At some future date, the state of Tennessee may adopt enterococci-based water quality criteria.

4.1.4 Water Pollution Control

National Pollutant Discharge Elimination System Compliance. Division Waste Management staff monitored the various phases of operation at the ORR wastewater treatment facilities, including their radiological effluents, their potential impacts to water quality both on and off the ORR, and their possible impacts to human health and the environment. Staff reviewed monthly discharge monitoring reports for reported noncompliance with NPDES permits at ETTP, ORNL, and Y-12. The Division of Water Pollution Control holds the official copies of these permits. Radiological NPDES data reported in discharge monitoring reports were periodically reviewed and evaluated to determine the effectiveness of DOE's water pollution control program in protecting waters of the state from radioactive contaminants.

NPDES activities also included the following:

- Division staff coordinated with the Division of Water Pollution Control concerning the renewal of NPDES permits for ORNL and Y-12. Water Pollution Control issued the new NPDES permit for Y-12 in March 2006, with an effective date of May 1, 2006. Y-12 has formally appealed a number of terms set forth in the new permit.

- Division staff accompanied Division of Water Pollution Control personnel during an inspection of ORNL. No significant problems were noted from this inspection.

- The staff continued to monitor levels of mercury in East Fork Poplar Creek at Station 17 at the Y-12 boundary (see Figure 1). A 1999 TDEC consent order mandates management of mercury concentrations in East Fork Poplar Creek. DOE has been unable to achieve an interim guideline of 5 grams per day (averaged over 3 months).

Aquatic Resource Alteration Permits and Wetlands Protection. The division assisted DOE and the Division of Water Pollution Control, Knoxville Environmental Field Office, in review of Aquatic Resource Alteration Permits for construction and maintenance projects on the ORR. The division's involvement and recommendations, including site visits and CERCLA documentation review, facilitated and streamlined

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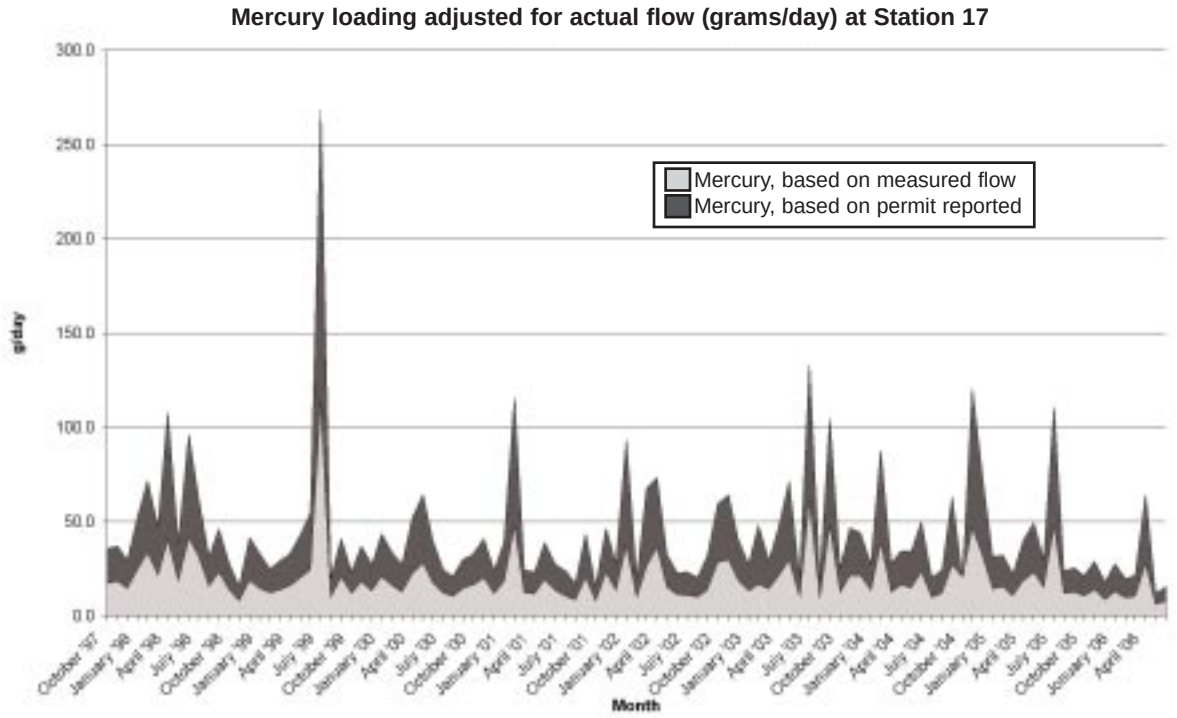

Figure 1. Mercury loadings for East Fork Poplar Creek at the Y-12 boundary, October 1997–April 2006.

permitting decisions. The Division of Water Pollution Control holds the official copies of the permits.

In FY 2006, division staff inspected erosion and sediment control practices at various sites on the ORR, including those related to upgrades at the ORNL campus and construction of the Visitor Interface Building at Y-12. With construction of a new building under way at ETTP's Horizon Center, division staff continued to monitor erosion control practices at this site as well.

Biosolids Application Program. This program results from an agreement between DOE and the city of Oak Ridge to allow the city to spread limited quantities of Class B sludge from the municipal sewage treatment plant on ORR property. In FY 2006, division staff participated in the ORR Biosolids Working Group, composed of city, DOE, and DOE contractor representatives. DOE rejected the city's request for a 1-year extension for disposal of biosolids at the Y-12 industrial landfill.

Toxicity Biomonitoring. DOE, in accordance with its NPDES permits, performs toxicity testing of final effluents from waste treatment facilities. Testing for the survival and growth of organisms determines what impacts, if any, DOE discharges have on aquatic life in streams on the ORR. The division continued to evaluate results from DOE's self-monitoring program, which are published annually in the DOE ORR Annual Site Environmental Report and reported in discharge monitoring reports.

DOE reports confirmed that, with one exception, DOE waste treatment effluents did not exhibit toxicity in excess of the permit limits. During May 2–9, 2006, ORNL conducted a toxicity test for effluent from the Sewage Treatment Plant. Reproduction of the test invertebrate was reduced, demonstrating toxic conditions and a permit violation. Confirmation testing conducted on May 30–June 6, 2006, showed no toxicity.

4.2 AIR QUALITY

There have long been concerns that air emissions from the ORR might be a cause of illness among area residents. While airborne emissions have decreased with the end of many earlier operations on the ORR, current processes continue to pose a threat to the local air quality. These processes include incineration of radioactive and hazardous wastes, production of radioisotopes, nuclear reactor operations, and remedial activities. As a consequence, the division has developed air monitoring programs to assess the impact of ORR air emissions on the surrounding environment and the effectiveness of DOE controls and monitoring systems.

4.2.1 Ambient Air Monitoring for Radionuclides

To meet TOA requirements for monitoring of radiological air emissions, the division has developed three integrated, but distinct, air monitoring systems. Together, the systems collect samples from 22 air monitors placed on and near the reservation. The Perimeter Air Monitoring Program assesses effluents at exit pathways from the reservation. The Fugitive Air Program focuses on non-point sources of air emissions and sites of special interest. And, the RadNet/Environmental Radiation Ambient Monitoring System (ERAMS) program supplements the other two programs, targets specific operations (e.g., the HFIR and the TSCA Incinerator), and provides independent verification of both state and DOE monitoring data.

Perimeter Air Monitoring Program. The Perimeter Air Monitoring Program uses 12 low-volume air samplers. Eleven are at locations where airborne pollutants would likely exit the ORR; the other is at Fort Loudoun Dam and serves as a background station. Data collected from the perimeter monitors have been largely consistent with background measurements. Gross beta results above background have been noted at stations near Y-12, but the levels measured are well below standards provided in the Clean Air Act.

Fugitive Air Monitoring Program. The Fugitive Air Monitoring Program uses four high-volume air samplers mounted on trailers to monitor fugitive/diffuse sources of radioactive air emissions. Since these units are mobile, the samplers can be placed near sites where contaminants might be released (e.g., because of building demolition or remedial activities). Data from the mobile units are compared to background results and standards provided in the Clean Air Act.

Two of the mobile samplers were stationed at ETTP in 2005 and 2006 to monitor the D&D activities. Many of the approximately 500 facilities scheduled for demolition are contaminated with uranium isotopes, but TRU radionuclides (e.g., neptunium-237,

plutonium-239, and technetium-99) may also be present. One of the ETTP samplers was placed near the K-25 process building, and the other was positioned next to the K-1420 Decontamination and Uranium Recovery Facility. This building is known to contain significant contamination, and dose measurements taken by the division's Environmental Dosimetry Program from an outside wall of the building have consistently been relatively high (716 mrem/year for 2005). Demolition of K-1420 is currently under way.

The third mobile unit is located at the southeast corner of the EMWMF in Bear Creek Valley. During disposal and before being covered, waste materials are subject to dispersion by winds that blow through the valley.

As can be noted in Figure 2, gross alpha results for the current monitoring stations have been similar to background, with two exceptions. In both cases, the result was for a sample collected at K-1420. These results are represented by the two lone peaks in Figure 2 during the November time frame. While it seems probable the results are due to activities at K-1420, the measurements are within the range of background concentrations and are not considered high when compared to Clean Air Act standards. It should be noted that the gaps in the line representing results for the EMWMF monitor in Figure 2 reflect time periods when data were not collected, due to problems encountered with the power source for the sampler.

A fourth mobile unit was acquired in July 2006 and placed at ORNL's North Tank Farm to monitor activities planned at the Corehole 8/Tank W-1A remedial site. The site is centrally located in a high-traffic area on ORNL's main campus. In the past, a number of underground storage tanks were placed at this location to store and/or treat radioactive and hazardous wastes from ORNL operations. In the 1990s, Tank W-1A was discovered to be the source of the Corehole 8 groundwater plume, which covers a large area adjacent and to the west of the site.

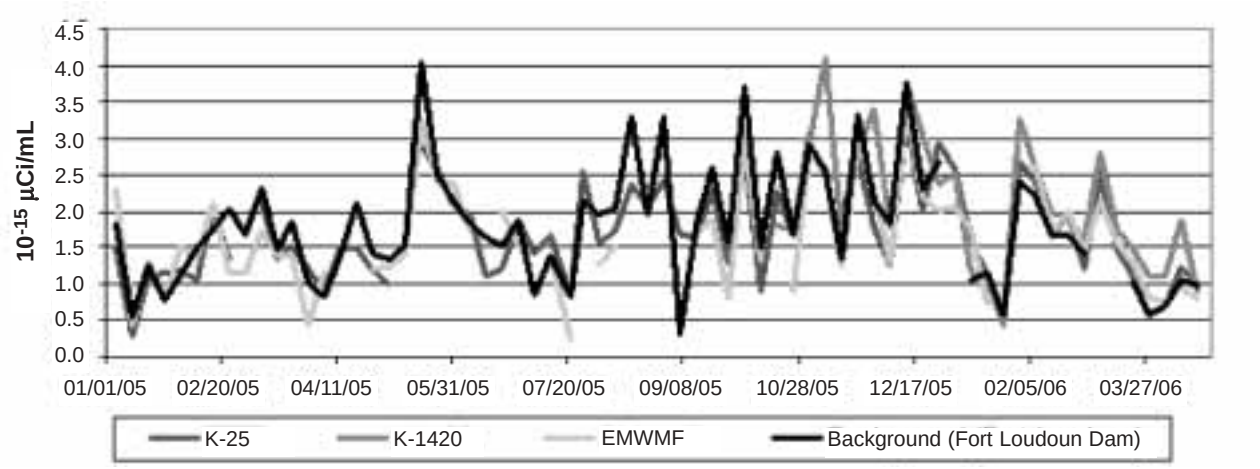

Figure 2: 2005 and 2006 gross alpha results from fugitive air monitoring performed on the ORR and at the background location at Fort Loudoun Dam.

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In 1998, DOE proposed removing Tank W-1A and associated soils that have developed into a secondary source of contamination feeding the plume. The removal began in 2001 but was suspended after higher-than-anticipated radiation levels were encountered. Soil cores are currently being taken at the site to better characterize the contamination in preparation for project completion. Sample results had not been received from laboratory at the time of this report.

RadNet/ERAMS Air Monitoring Programs. ERAMS was established to track environmental releases of radioactivity from nuclear weapons tests and accidents across the United States. In response to division requests and an initiative to incorporate site-specific monitoring into the program, EPA agreed to locate five of the ERAMS air monitors on the ORR. These monitors have been in continuous operation since 1996, except during maintenance. EPA changed the name of the program to RadNet in 2005 to reflect planned upgrades, but no substantial changes are anticipated for the ORR program in the near future.

In the ORR program, samples are collected by division staff from each of the five RadNet air stations twice weekly and mailed to EPA's National Air and Radiation Environmental Laboratory in Montgomery, Alabama, for radiochemical analysis. The laboratory performs gross beta analysis on each sample and gamma spectrometry on samples where the beta results exceed 1.0 picocurie per cubic meter. So far, none of the gross beta results reported in 2005 and 2006 have exceeded the screening level. As in the past, the gross beta results for the five RadNet/ERAMS monitors had very similar trends and concentrations. As observed in the Perimeter Air Monitoring Program, slightly higher results were reported at monitoring stations located near Y-12. However, the levels measured were well below associated standards and do not indicate harm to the local environment or public health.

RadNet Precipitation Monitoring. A precipitation monitor was added to the RadNet/ERAMS program in 2005 to capture contaminants washed out of the atmosphere by precipitation. No standards apply directly to contaminants in precipitation, but the data can indicate the presence of radioactive materials that may not be evident in particulate analysis.

One of the radionuclides of interest is tritium, an isotope commonly found on the reservation. Small amounts of tritium are naturally produced in the atmosphere, but the isotope is

RADIATION

Radiation is the energy released when unstable atoms break down into more stable configurations. If this energy removes electrons from atoms, it produces electrically charged particles known as ions and is referred to as ionizing radiation. The interaction of the charged particles with nearby atoms results in the damage commonly associated with ionizing radiation. Potential health effects from high exposures to ionizing radiation include damage to developing embryos, genetic mutations, cancer, and, in very extreme cases, death.

The amount of damage caused by ionizing radiation depends on the dose of radiation an individual receives, which in turn is dependent on the type, intensity, and duration of the exposure. Alpha, beta, and gamma radiation are the most common types of ionizing radiation. Alpha and beta radiation are not considered external hazards, because they are easily shielded and do not pass through the skin. They can, however, cause significant damage internally if they are ingested, inhaled, or absorbed into the body. On the other hand, gamma radiation is considered an external hazard, because it readily penetrates the skin and other tissues of the body, resulting in whole body exposures.

also released as water vapor in reactor effluents and from evapotranspiration associated with buried wastes. In light of the above, the precipitation monitor provided by EPA was placed at an existing RadNet station near ORNL's HFIR and SWSA 5 Burial Grounds (the major source area for tritium on the reservation).

The tritium concentration for the precipitation samples analyzed through 2005 averaged 147 picocuries per liter (pCi/L), with a median value of 114 pCi/L and a high of 552 pCi/L. For this period, data from the other 37 RadNet stations across the nation averaged 20 pCi/L, with a median value of 7 pCi/L and a high of 1,718 pCi/L. Data for states adjacent to Tennessee averaged 16 pCi/L, with a median value of 6.5 pCi/L and a high of 739 pCi/L.

4.2.2 Monitoring of Gamma Radiation on the ORR

Gamma radiation is emitted by various radionuclides that have been produced, stored, and disposed on the ORR. Associated contaminants are evident in ORR facilities and the surrounding environment. To assess the risks posed by these contaminants, the division uses continuous gamma monitors and environmental dosimeters to measure radiation exposure rates and doses from external radiation at selected locations on and near the ORR. Internal hazards are addressed in the division's air and water monitoring programs.

The dosimeters are used to determine the annual radiation dose (mrem/year) an individual would receive from external sources if he or she remained at the monitoring location 24 hours a day for 1 year (8,760 hours). Therefore, the reported doses should be viewed as conservative estimates of the maximum external dose an individual would receive for the period reported (e.g., quarterly or yearly). The environmental dosimetry results are compared to the state and DOE maximum dose limit for members of the public (100 mrem/year).

Where exposure rates are expected to fluctuate over short periods or there is a potential for the accidental release of radioactive contaminants, the dose rate monitors are used to record radiation levels at much shorter intervals (e.g., minutes). These measurements are compared to the state's limit for the maximum dose to an unrestricted area (2 mrem in any one-hour period).

The monitoring locations and associated results for the program can be roughly organized into three categories: (1) sites off the ORR, (2) sites on the ORR potentially accessible to the public, and (3) sites in restricted areas.

Sites off the ORR. The doses reported for monitoring stations off the reservation (e.g., residential areas) for 2005 and the first quarter of 2006 were all consistent with background measurements and well below the 100 mrem/year dose limit for members of the public.

Sites on the ORR Potentially Accessible to the Public. Historically, access to the reservation has been predominantly restricted to employees of DOE and its contractors. Consequently, locations within the fenced areas of the ORR have traditional been

viewed as inaccessible to the general public. In more recent years, DOE's reindustrialization and revitalization efforts have resulted in an influx of businesses and workers that are not directly associated with DOE operations. When these individuals are viewed as members of the public, several sites within the boundaries of the ORR became problematic. In 2005 and the first quarter of 2006, remediation significantly decreased the radiation associated with several of these problem sites.

The most significant decreases were achieved at ETTP's UF_6 Cylinder Storage Yards. In previous years, the doses measured at these facilities have consistently been among the highest reported in the program. In addition, the rusted and deteriorating cylinders have posed a risk for the release of both radioactive and toxic materials to the environment. DOE has been transporting cylinders to Portsmouth for conversion of the remaining UF_6, a job that should be complete in FY 2007.

The K-1420 Decontamination and Uranium Recovery Facility at ETTP has also seen dose measurements above the primary dose limit. The building was constructed in 1954 to house decontamination and uranium recovery operations, including the disassembly and chemical decontamination of gaseous diffusion equipment. In 1999, DOE's Reindustrialization Program contracted with a private firm to decontaminate the facility, but the effort was abandoned following a contract dispute. The facility was subsequently scheduled for demolition, which is currently under way. The dose reported for 2005 (716 mrem) was above the primary dose limit, but the level should decline when demolition is complete.

The K-1420 Decontamination and Uranium Recovery Facility at ETTP has also seen dose measurements above the primary dose limit.

The situation at ORNL is somewhat different: Land adjacent to the main campus has been deeded to organizations outside of DOE, buildings have been constructed using private funds, and facilities are being occupied by non-DOE contractors. Access to the site is controlled for security purposes, but admittance is allowed with the appropriate visitor's pass. Within the access-controlled area, sites have been designated as radiation areas for safety, but the doses measured at the boundary of some of these areas have exceeded the primary dose limit and approached the state's limit for the dose to an unrestricted area (2 mrem/hour).

As with ETTP, this year saw a decline at ORNL in the number of sites considered potentially accessible to the public that exceeded the primary dose limit. The decline can largely be attributed to the completion of remedial activities at ORNL's surface impoundments, temporary cessation of activities at the Corehole 8 Remedial Action, and the removal of wastes generated by these activities that had been stored at the Environmental Restoration Coal Yard Storage Area (and other sites across ORNL's main campus). The highest dose rates reported in the program, approximately 1.8 mrem/hour, were measured in 2003 outside the boundary of a restricted area at the Coal Yard Storage Area where waste from the Surface Impoundments and Corehole 8 remedial

projects had been stored. After these wastes were removed, the dose rates, which had been approximately 90 percent of the state limit for an unrestricted area, fell to background levels.

Several other monitoring locations at ORNL potentially accessible to the public reported doses greater than 100 mrem/year in 2005. They include the White Oak Creek Weir at Lagoon Road (305 mrem), the ORNL MSRE (796 mrem), and a hot spot found on Haw Ridge (225 mrem).

Sites within ORR Restricted Areas. While conditions could change, most of the sites that have reported results appreciably above the primary dose limit for members of the public are located within restricted areas of the reservation. It is beyond the scope of this report to address each of these sites individually, but several merit comment.

The Cesium Forest. The highest annual doses reported for a number of years have been from dosimeters placed on a tulip poplar tree in ORNL's "Cesium Forest." In 1962, a group of trees at this location were injected with 360 millicuries of cesium-137 as part of a study on the isotope's behavior in a forest ecosystem. Based on the dosimetry results, it appears a significant amount of the cesium remains in the trees and local environment, but the dose rate is slowly decreasing as the radionuclide decays or migrates from the location. The dose reported for 2005 was 14,456 mrem, compared to 14,801 mrem in 2004 and 15,325 mrem in 2003.

The highest exposure level recorded in 2005 was about a quarter of the state's maximum dose to an unrestricted area in any 1-hour period.

Environmental Management Waste Management Facility. The EMWMF is a CERCLA waste disposal facility constructed in Bear Creek Valley near Y-12 to dispose of wastes generated by remedial activities on the ORR. To assess whether waste proposed for disposal meets the facility's waste acceptance criteria, DOE relies on waste profiles submitted by the remedial projects. These profiles are based on an average of contaminants in each waste lot. Since the size of waste lots varies from a single package to many truckloads, the averages reported do not necessarily represent each truckload of waste transported to the facility. That is, some loads may have highly contaminated wastes, while others may contain very little contamination.

An effort is being made to gauge variability in the radioactivity of waste disposed at the EMWMF. Dose rate monitors have been secured at weigh-in stations at which trucks transporting waste must stop. When waste containing gamma emitters are not near the weigh station, the dose levels are similar to background measurements. As trucks carrying gamma emitters pull into the weigh station, the exposure levels increase, peak as the waste moves past the monitor, then abruptly decline as the trucks pull away.

The highest exposure levels recorded at the EMWMF in 2005 were during the delivery of soils/sediments from remediation of the Homogeneous Reactor Experiment

Retention Basin and ETTP's K-770 Scrap Yard. The retention basin received effluents from the second of two reactors operated at the site. After release to the basin, effluents were flocculated and liquids released to a tributary southeast of the impoundment. The K-770 Scrap Yard primarily received contaminated scrap metal from the K-25 facility, but waste from other locations have been found at the site. Among anomalies identified were three casks containing highly radioactive wastes.

In 2005, the measurements taken at the EMWMF ranged from 6 to 475 mrem/hour and averaged 8.3 mrem/hour. The highest value, 475 mrem/hour, is about a quarter of the state's maximum dose to an unrestricted area in any 1-hour period (2,000 mrem/hour). This is considerably lower than measurements taken in 2003 and 2004. In 2003, the highest measurements were recorded during the delivery of waste from the Surface Impoundment Remedial Action. The highest of these measurements, 1,612 mrem/hour, is about 80 percent of the state limit. The highest dose rates recorded in 2004 were taken during the delivery of wastes associated with the Corehole 8 Remediation. The highest value, 1,720 mrem/hour, is about 85 percent of the state limit.

4.2.3 Air Pollution Control

Review of Permitted Air Emissions Sources. The division conducted periodic reviews of air permitting documentation for ETTP, ORNL, and Y-12. Division staff assisted with the file review for the annual TDEC Division of Air Pollution Control inspection at ETTP.

Oversight of Asbestos Management and Removal. The division continued oversight of asbestos management and removal on the ORR to ensure compliance with air pollution control and solid waste management regulations.

Air Pollution Monitoring for Heavy Metals. In 1997, the division established an independent monitoring effort to identify overall levels of hazardous pollutants in the air on and around ETTP. The division established comparable air monitoring programs at ORNL and Y-12 in 1999. High-volume samplers are operated at these sites, and samples are collected and analyzed at the state environmental laboratory in Nashville for the following selected heavy metals: arsenic, beryllium, cadmium, chromium, lead, nickel, and uranium as a metal. During the past year, changes in the program have been initiated to facilitate comparisons of future data collected by the division with heavy metal data collected by DOE at ETTP.

Results from the 2006 monitoring campaign conducted by TDEC at the three sites indicate no levels of the six hazardous air pollutant metals above local background values. Lead values were at less than one percent of the environmental standard. Uranium, analyzed as a metal, was not detected.

4.0 Oak Ridge Regional Environment

4.3 SOIL AND SEDIMENT QUALITY

4.3.1 Sediment

The division's Environmental Monitoring and Compliance Program samples sediments at 34 sites, with 11 on the Clinch River and two on the Tennessee River. The other 21 sites are located on tributaries of the Clinch draining from the ORR; these are considered exit pathways. None are on a stream such as White Oak Creek or Poplar Creek that has already been identified as contaminated and that is currently monitored by DOE.

Samples were analyzed for organic, inorganic, and radiological contaminants. The results were compared with standards, known as Preliminary Remediation Goals, established for the ORR based on guidance from EPA. These standards were used because there are no regulatory guidelines for sediment quality, either at the state or federal level. The sediments met the standards for recreational use, meaning that people can safely engage in activities such as fishing, hiking, and playing at these locations.

4.3.2 Underwater Survey

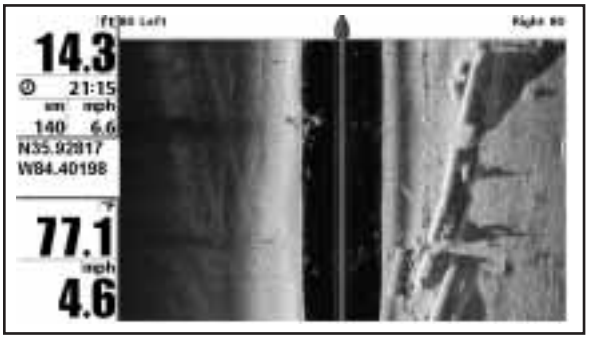


Figure 3: A sonar image showing an anomaly at Poplar Creek Mile 1.8.

The Underwater Survey Project uses a side-imaging sonar unit to survey the bottom of selected areas of the Clinch River and Poplar Creek, searching for possible sources of contamination from DOE activities on the ORR. Two anomalous structures have been located to date. One, located at approximately Clinch River Mile 12.9, appears to be a section of concrete culvert that has fallen into the river. This structure will be further investigated when water levels lower in the fall. The other anomaly is located on Poplar Creek at approximately Poplar Creek Mile 1.8 (see Figure 3). These structures are still being investigated.

4.3.3 Radiological Field Surveys

With the construction of new roads and the reassignment of existing ones for hauling DOE waste, a program was necessary to monitor the new traffic. Currently, the division is monitoring Reeves Road and the New Haul Road twice a month. Reeves Road is a haul road that carries radioactive waste over Chestnut Ridge from ORNL to the EMWMF. The New Haul Road carries radioactive waste from D&D activities at ETTP to the EMWMF.

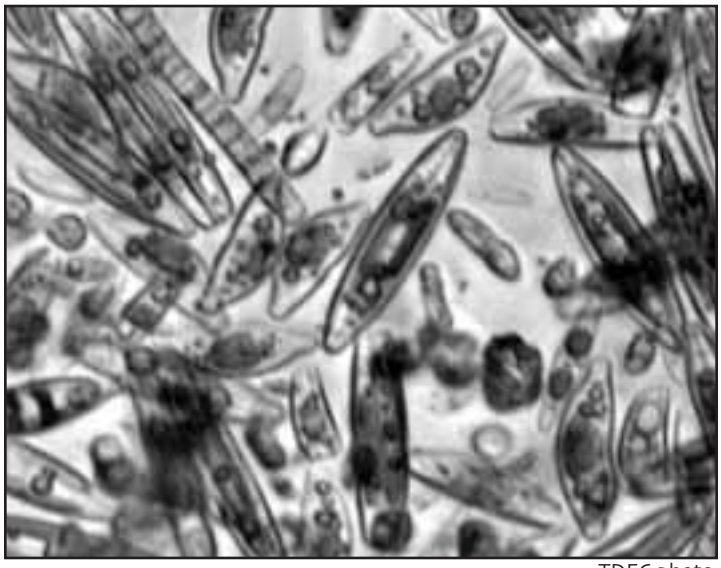
These surveys use a sodium iodide portable gamma detector. To date, no elevated readings or unidentifiable visible staining (contamination) have been observed on either Reeves Road or the New Haul Road. If detector readings become elevated or visible staining is observed, additional radiological instrumentation will be used.

Lagoon Road was surveyed in early 2006 during the transfer of soils to SWSA 5 from an off-site borrow area. This survey ensured trucks were not carrying contaminated soils out of the area on their tires. Lagoon Road is now closed and this service is no longer necessary. No elevated readings were encountered during this time.

4.4 FOOD AND WILDLIFE QUALITY

4.4.1 Environmental Biomonitoring and Oversight

The ORNL Biological Monitoring and Abatement Program (BMAP), a joint program by DOE and its contractor UT-Battelle, examines the effects of DOE-related activities on the ORR and the surrounding community. The program studies various organisms on land and in streams originating on the ORR. Studies include aquatic toxicity testing, bioaccumulation monitoring, the use of biological indicators, and in-stream ecological monitoring of fish and benthic macroinvertebrate communities. These projects help define the overall health of a system by assessing its biotic integrity, identifying possible sources of ecological damage, and determining the effectiveness of DOE remediation efforts. BMAP sampling efforts have established a large database of information spanning nearly 2 decades. BMAP oversight activities and independent sample monitoring by the division provide a means of assessing the integrity of results obtained and assessments made by BMAP personnel. They also provide an independent analysis of the sampling locations.



TDEC photo

This illustrates the microscopic world of the water in Bear Creek. Pictured here are the bodies, called tests, of the diatoms. The health and abundance of these diatoms can be an indicator of the health of the stream.

4.4.2 Aquatic Plant Sampling

The Environmental Restoration Support Section of the Radiological Monitoring and Oversight Program continued the independent biological monitoring project. The project monitors aquatic vegetation on the ORR, using species such as watercress and green algae to indicate radiological and metals contamination from groundwater. Habitats monitored included springs, seeps, spring tributaries, East Fork Poplar Creek, and background locations.

For 2006, this project refocused on sites at the three ORR facilities that had not been sampled before or had not been sampled in the past 3 years. The project still looks at contaminant uptake in aquatic plants as an indicator of water quality in the surrounding area. Watercress is preferred because its abundance allows sampling to be as similar

4.0 Oak Ridge Regional Environment

TDEC photo

Chris Yarnell of the division's Radiological Monitoring and Oversight program samples watercress at a spring. The project measures the amounts of radioactivity taken up by the plants from the spring water.

across sites. Where there is no watercress or watercress colonies are sparsely populated, other water weeds and algae will be sampled. To date, 12 sampling locations have been determined but not yet sampled. Sampling is scheduled to begin in late July to early August so as to give the plants ample time to reach full summer maturity. The division hopes to show that these areas indeed have an effect on the food chain and may be impacted by contaminants in the surrounding environment. Levels will be compared to U.S. Food and Drug Administration contaminant guidelines.

4.4.3 Milk Sampling

The division's Environmental Monitoring and Compliance Program oversees DOE's milk sampling program for areas surrounding the ORR. Contractors for DOE and UT-Battelle take samples of milk from two locations in the vicinity of the ORR and one background location in Maryville and analyze them for radiological contamination. The data show that milk from the sampling area is not contaminated.

4.4.4 Vegetable Sampling

The division's Environmental Monitoring and Compliance Program oversees DOE's vegetable sampling program for areas around the ORR. DOE contractors purchase lettuce, tomatoes, and turnips from area gardeners for radiological analysis. There are six sampling sites: three in Oak Ridge, one between Kingston and Oak Ridge, one between Lenoir City and Oak Ridge, and one in the Claxton community. The data show no radiological contamination in the vegetables.

4.4.5 Hay Sampling

The division's Environmental Monitoring and Compliance Program oversees DOE's hay sampling program for areas around the ORR. DOE contractors sample and analyze hay each year for gross alpha, gross beta, and gamma activity. Hay is sampled at seven locations around the ORR; one site is a background site near Norris Dam. The data show no radiological contamination in the hay.

4.4.6 Fish

Each year, division personnel inspect signs that advise the public against fish consumption and water contact in waters that have been or could be impacted by DOE operations. The advisory posting program is part of a larger, more encompassing

Current Fish Advisories

Stream	County	Portion	Pollutant	Comments
East Tennessee				
Boone Reservoir	Sullivan, Washington	Entirety	PCBs, chlordane	Precautionary advisory for carp and catfish.*
Chattanooga Creek	Hamilton	Mouth to GA line	PCBs, chlordane	Fish should not be eaten. Avoid contact with water also.
E. Fork of Poplar Creek, incl. Poplar Creek embayment	Anderson, Roane	Mile 0.0-15.0	Mercury, PCBs	Fish should not be eaten. Avoid contact with water also.
Fort Loudon Reservoir	Loudon, Knox, Blount	Entirety (46 miles)	PCBs	Commercial fishing for catfish prohibited by TWRA. Catfish, largemouth bass over two pounds, or any largemouth bass from the Little River embayment should not be eaten.
Melton Hill Reservoir	Knox, Anderson	Entirety	PCBs	Catfish should not be eaten.
Nickajack Reservoir	Hamilton, Marion	Entirety	PCBs	Precautionary advisory for catfish.*
N. Fork Holston River	Sullivan, Hawkins	Mile 0.0-6.2	Mercury	Fish should not be eaten. Advisory goes to TN/VA line.
Pigeon River	Cocke	NC Line to Douglas Reservoir	Dioxin	Precautionary advisory for carp, catfish, and redbreast sunfish.*
Tellico Lake	Loudon, Monroe	Entirety	PCBs	Catfish should not be eaten.
Watts Bar Reservoir	Roane, Meigs, Rhea, Loudon	TN River portion	PCBs	Catfish, striped bass, hybrid striped bass, and white bass should not be eaten. Precautionary advisory* for sauger, carp, smallmouth buffalo, and largemouth bass.
Watts Bar Reservoir	Roane, Anderson	Clinch River arm	PCBs	Striped bass should not be eaten. Precautionary advisory for catfish and sauger.*
Middle Tennessee				
Woods Reservoir	Franklin	Entirety	PCBs	Catfish should not be eaten.
West Tennessee				
Loosahatchie River	Shelby	Mile 0.0-20.9	Chlordane	Fish should not be eaten.
McKellar Lake & Nonconnah Creek	Shelby	Mile 0.0–1.8	Chlordane	Fish should not be eaten. Advisory ends at Horn Lake Road bridge.
Mississippi River	Shelby	MS line to mile 745	Chlordane	Fish should not be eaten. Commercial fishing prohibited by TWRA.
Wolf River	Shelby	Mile 0.0-18.9	Chlordane	Fish should not be eaten.

* Precautionary Advisory: Children, pregnant women, and nursing mothers should not eat the fish species named. All other persons should limit consumption of the named species to one meal per month.

sign-posting and sign-inspection project coordinated by the TDEC Environmental Field Offices in Knoxville and Chattanooga.

The division focuses its efforts on waters within and surrounding the ORR. Areas of responsibility include the Clinch River and Melton Hill Lake above Melton Hill Dam, as well as Watts Bar Reservoir, including the Lower Clinch River, Tennessee River, and Lower Tennessee River arms. The advisory postings include warnings against consumption of catfish, striped bass, and Cherokee bass (striped bass/white bass hybrid). Precautionary postings warn pregnant women, nursing mothers, and children not to eat the listed fish. All others are warned to limit their consumption to about two meals per month. Fish included on precautionary signs are white bass, sauger, carp, smallmouth buffalo, and largemouth bass.

Posting inspections are also conducted along East Fork Poplar Creek from the Y-12 Bear Creek Road entrance to the westernmost point at which Oak Ridge Turnpike crosses the stream. Signs have been placed along this portion of East Fork Poplar Creek, effectively covering the residential areas of Oak Ridge. Postings warn against swimming, wading, and fishing.

The 2006 sign posting inspections were conducted from March 27–April 3. The status of each posting at the time of inspection can be obtained from division Environmental Monitoring and Compliance personnel.

In FY 2005 the division participated in a joint effort with the TDEC Division of Water Pollution Control, TVA, and ORNL to sample fish on Watts Bar Reservoir, analyze the tissue, and determine if current postings need to be revised. TVA and ORNL collected the fish, and the division conducted analyses. The data (see Tables 1 and 2) will be given to the Division of Water Pollution Control for evaluation of current postings.

Table 1. Results of PCB Analysis (parts per million) of Fish Tissue Samples from Watts Bar Reservoir

Site	Channel Catfish	Large Mouth Bass	Sauger	Buffalo	Striped Bass	White Bass	Carp
TRM 531	0.3[a] 0.18[b]	0.3[a]		U[c]	U[c]	U[c]	U[c]
TRM 560.8	0.3[a]	0.3[a]					
TRM 600	0.3[a]	U[c]				0.44[c]	
CRM 19	0.21[b]	U[c]	0.19[c]		0.10[b,d]		

[a]TVA Results
[b]ORNL Results
[c]Collected at CRM 3.0
[d]Division Results

CRM = Clinch River Mile
PCB = polychlorinated biphenyl
TRM = Tennessee River Mile
U = Undetectable

Table 2. Results of Mercury Analysis (parts per million) of Fish Tissue Samples from Watts Bar Reservoir

Site	Channel Catfish	Large Mouth Bass	Sauger	Buffalo	Striped Bass	White Bass	Carp
TRM 531	0.3[a] 0.23[b]	0.22[a]		0.19[c]	0.07[c]	0.05[c]	0.19[c]
TRM 560.8	0.14[a]	0.18[a]					
TRM 600	0.14[a]	0.14[a] 0.10[c]				0.06[c]	
CRM 19	0.14[b]	0.26[a] 0.29[c]	0.07[c]		0.09[b,d]		

[a]TVA Results
[b]ORNL Results
[c]Collected at CRM 3.0
[d]Division Results

CRM = Clinch River Mile
TRM = Tennessee River Mile

4.4.7 Aquatic Life

During spring 2006, division personnel conducted oversight trips in conjunction with ORNL BMAP fish and benthic macroinvertebrate sampling events. Established scientific sampling protocols and techniques were followed, and no concerns were noted.

The division conducts an independent assessment each year of benthic macroinvertebrate communities in streams on the ORR and off site. Most sampling sites overlap the BMAP sites and allow general comparison between results. The division has adopted the Division of Water Pollution Control Standard Operating Procedures for macroinvertebrate stream surveys. This method uses a semiquantitative approach and assesses the biotic integrity of a stream based on criteria developed for the unique region, or "ecoregion." Results from the 2006 spring sampling event will be published in the 2006 Environmental Monitoring Report, which will be available in early 2007. Results from a prior year's independent sampling events can be found in that year's Environmental Monitoring Report.

Surface water samples are collected semiannually at all benthic macroinvertebrate sampling sites. Samples are analyzed for nutrient, microbiological, mercury, metal, radiological, and routine (residue and hardness) constituents. Sampling is conducted in support of the benthic sampling and provides a snapshot of stream water conditions. Results of the surface water sampling efforts can be obtained from division Environmental Monitoring and Compliance personnel.

4.4.8 White-Tailed Deer

Division personnel monitor results from the fall deer hunts conducted on the ORR. The annual deer hunts began in 1985 as a method of population control. The most

prevalent contaminants found in the deer are cesium-137, a gamma emitter known to accumulate in body tissue, and strontium-90, a beta emitter known to accumulate in bone. Deer are a bioindicator of the effectiveness of the overall environmental cleanup program. Three weekend hunts were conducted in 2005, on November 12–13, December 3–4, and December 17–18. Of 350 deer taken in the hunts, three (0.9 percent) were retained due to internal radiological contamination. Hunt data can be obtained from division Environmental Monitoring and Compliance personnel or online at <www.ornl.gov/sci/rmal/huntinfo.htm>.

4.4.9 Canada Geese

In 1998, numerous geese were collected from ORNL and found to have levels of contamination above the administrative release level of 5 picocuries per gram (pCi/g). The division initiated an off-site collection to ascertain whether contaminated geese were traveling off the reservation. To date, no contaminated geese have been found off the ORR.

Past studies conducted by ORNL personnel have shown that a small proportion of Canada geese residing at ORNL may become contaminated. Consequently, an annual goose roundup is conducted at ORNL, locations near ETTP and Y-12, and other sites on the ORR. Geese are collected and scanned to determine if they are contaminated by radionuclides and other hazardous contaminants. Since 1991, this has been a cooperative project between the Tennessee Wildlife Resources Agency, DOE, BMAP teams, and division staff.

The 2006 roundup was conducted on June 22–23. Canada geese were caught on and around the ORR. A total of 295 geese were collected from five locations: two at ORNL, two at ETTP, and at Clark Center Park. None had levels of contamination above the administrative release limit of 5 pCi/g.

4.4.10 Wild Turkey

Two managed weekend hunts on the ORR are open to the public each year. In 2006, turkey hunts were held on April 1–2 and April 8–9. No turkeys were retained due to internal radiological contamination. Three birds have been retained since the managed turkey hunts began (in 1997, 2001, and 2005) due to elevated strontium readings. The administrative release criteria for strontium are 20 pCi/g for bone tissue and 5 pCi/g for whole body count.

4.4.11 Clinch River Fish Sampling

ORNL personnel conduct biological monitoring in the Clinch River to examine potential exposure to the public from the consumption of contaminated fish. Sunfish and catfish are collected annually at designated test sites and reference locations in the river. Fish fillets are analyzed for metals, pesticides, PCBs, cobalt-60, cesium-137, and total radioactive strontium. Results of sampling in 2005 indicated pesticides and PCBs continue to be present in fish tissue at all sampling locations. Laboratory results can be obtained from division Environmental Monitoring and Compliance personnel. Sampling

oversight activities were conducted in June 2006, but results were not available at the end of the fiscal year.

4.4.12 Threatened and Endangered Species

Division personnel conduct evaluations on threatened and endangered plant and animal species on the ORR in support of the TDEC Division of Natural Heritage. Field surveys are conducted and report documents are reviewed as needed. The division keeps an inventory of those plant and animal species that are on the state and EPA lists for surveillance.

TDEC photo

Division staff oversee fish measurement for an ecological investigation of the K-1007-P1 pond at ETTP.

5.0 Key Challenges

The following is a summary of key challenges facing DOE, the community, and the state.

5.1 GROUNDWATER MANAGEMENT STRATEGIES

The CERCLA remedial action strategy at Oak Ridge has long been to make cleanup decisions on sources of contaminants before addressing groundwater. Sources may be burial grounds, spill sites, leaking tanks, contaminated soils, etc. This strategy remains valid and is reflected in the types of RODs that have been put in place over the past decade. However, a difficult decision is left for the future: What is to be done about contaminated groundwater? Because of the complex geology and hydrology of the Oak Ridge site, the cleanup of contaminated groundwater is a daunting task. The present strategy is to attack sources first, and then institute groundwater remedies specific to individual problems. In some cases, groundwater can be remediated using traditional methods; in other cases, new technologies will be applied. However, some problems may not have definitive solutions by the time decisions must be made. Some remedies may take many years to return groundwater to a safe, usable condition. In this event, DOE must have adequate long-term stewardship and institutional controls in place to assure continued protectiveness to the environment and human health.

Some remedies may take many years to return groundwater to a safe, usable condition.

5.2 LONG-TERM STEWARDSHIP RESPONSIBILITIES

Contamination, both hazardous and radioactive, will remain on the ORR for many years, long after the cleanup program has come to a close. As a result, long-term risk to the public and the environment will remain unless active care and monitoring of this contamination is maintained. The state is requiring that DOE ensure adequate funding for this care, independent of annual appropriations from Congress. If it is to be effective, long-term stewardship must also be accompanied by improvements in record keeping, enforcement, surveillance, maintenance, monitoring, and funding.

At Oak Ridge, there will be continuing missions by the Office of Science and the NNSA. Both entities will have stewardship responsibilities for sites on their property, while closure sites will be managed by DOE's Office of Legacy Management. DOE must ensure that these offices have effective support for the long-term stewardship activities that are not otherwise part of their missions.

5.3 THE FEDERAL COMMITMENT

DOE continues to implement the Oak Ridge Accelerated Cleanup Plan. The program will close ETTP, complete interim actions in Melton Valley to cap historical disposal sites and control the spread of contamination in the groundwater, and finish other

high-risk projects on and off the ORR. Under this plan CERCLA cleanup at Oak Ridge is to be completed by 2016. If it is successful, it will reduce cost by an estimated $2 billion-plus and accelerate completion of the Environmental Management Program by five years. Results to date include disposal of nearly all stored legacy waste and pending completion of the activities in Melton Valley.

Although the Accelerated Cleanup Plan was signed by DOE, EPA Region 4, and the state, and the milestones were placed in the FFA, DOE has not provided sufficient funding to meet the scheduled goals, and future funding cuts are expected. This will result in delays and increased costs.

In addition to the planned Environmental Management work, there are numerous contaminated and decrepit buildings at Y-12 and ORNL that must be demolished to make way for new facilities and to eliminate maintenance costs. The proposed program for D&D of these facilities is the Integrated Facility Disposition Project. DOE has not yet committed to funding this program, which is needed to finalize cleanup of historical contamination on the ORR.

5.4 CHARACTERIZATION AND DISPOSAL OF RADIOACTIVE WASTE

One obstacle to completing accelerated cleanup is the characterization and disposal of stored radioactive waste, which DOE self-regulates. This waste is physically in the way of cleanup activities; administratively, the accelerated plan cannot be considered finished until this waste is characterized and properly disposed. While DOE has made strides in disposition of its stored radioactive waste, several issues remain.

One obstacle to completing accelerated cleanup is the characterization and disposal of stored radioactive waste, which DOE self-regulates.

Under the terms of the Closure Contract, DOE had obligated environmental management contractor BJC to disposition legacy waste by the end of FY 2005. The term “legacy” refers to waste that was in DOE Environmental Management program inventories before September 30, 2000, when waste was formally inventoried and categorized, coinciding with the effective date of DOE Order 435.1.

A special category of legacy LLW, “grandfathered waste,” is a waste certified to former waste handling acceptance requirements and requires incremental characterization for disposal.

Based on the assumption that responsibility for waste would be transferred from the Environmental Management program to generators for the disposition of newly generated waste, the Environmental Management program set a deadline for acceptance of National Nuclear Security Administration (NNSA) grandfathered waste. The transfer of this responsibility continues to be a moving target, and NNSA continues to store inventories of grandfathered waste. DOE must find an administrative pathway for the proper characterization and disposition of this subset of legacy LLW.

5.0 Key Challenges

Mixed waste has both radioactive and hazardous components. Although DOE is self-regulating in the area of radioactivity, states regulate the hazardous constituents in wastes. Because Tennessee has this authority, it has been able to negotiate milestones and targets with DOE for characterization, treatment, and disposal of mixed low-level and mixed TRU wastes under the Federal Facilities Compliance Act Site Treatment Plan. In general, understanding the composition of mixed wastes and funding their treatment and disposal are bottlenecks for moving these wastes out of storage and off the ORR. DOE must make disposition of the remaining "non-legacy" mixed waste a higher priority to comply with the Tennessee Site Treatment Plan.

Some especially dangerous wastes now stored at ORNL do not yet have a permanent disposal site. Known as remote-handled TRU wastes, they must wait until the Waste Isolation Pilot Plant in New Mexico conducts an audit of the ORR's TRU waste processing facility and issues an authorization allowing this waste to be shipped. The ORR has DOE's largest inventory of this waste destined for disposal at Waste Isolation Pilot Plant. As a result of past permit delays by New Mexico regulators, the state and DOE have had to renegotiate Site Treatment Plan schedules for this waste in Oak Ridge. DOE has requested that the TRU waste milestones be removed from the Site Treatment Plan. TDEC has denied the request, and DOE has disputed the state's decision. The matter remains under dispute.

Some especially dangerous wastes now stored at ORNL do not yet have a permanent disposal site.

DOE manages two important facilities for management of mixed wastes on the ORR, both of which have generated concerns for the state:

1. The TSCA Incinerator burns mixed waste contaminated with PCBs. At the same time that federal sites in other states want to use the TSCA Incinerator to dispose of wastes, DOE has not been able to work off the local waste inventory.

2. The EMWMF was built on the ORR to dispose of wastes produced during cleanup of the Oak Ridge sites. A TDEC audit of Melton Valley wastes disposed in the EMWMF revealed the need for closer inspection of wastes slated for disposal. EMWMF has strict rules regarding what wastes it will accept, and the state wants to be sure that these rules are being followed. Long-term management of wastes left in place under engineered caps, as well as wastes disposed at EMWMF, will remain a concern for the foreseeable future.

5.5 INCORPORATING HISTORIC PRESERVATION INTO CLEANUP ACTIVITIES

The ORR is home to three Manhattan Project-era plants designated by DOE as "Signature Facilities." These are the Graphite Reactor at ORNL, the Beta 3 Calutron Racetrack at Y-12, and the U-shaped K-25 gaseous diffusion building at ETTP. The Accelerated Cleanup Program includes plans for demolition of the K-25 building. Under

pressure from stakeholders and the state, DOE is studying the best way to preserve and interpret the history, features, and artifacts of K-25. Currently, a Memorandum of Agreement is in place to preserve the North Tower of the K-25 "U" for heritage tourism, with DOE obligated to decontaminate this building to free-release industrial standards. Other buildings in ORR historical districts have been or are slated for demolition.

Coordination with the Tennessee Historical Commission, an office of TDEC, ensures that the lessons of the Manhattan Project are not lost for future generations. Although environmentally hazardous facilities must be demolished and contaminated debris disposed, selected artifacts will be preserved, and buildings will be photographed and documented.

TDEC photo

The North Tower of the K-25 building, seen in this historical photo, is being evaluated for preservation.

6.0 Health Studies & Emergency Response

6.1 HEALTH STUDIES

Concerns have been raised for years concerning contaminants from the ORR and health problems they may have caused for on-site workers and nearby residents.

Several government agencies have moved to address these concerns, through energy-related research, health-related studies, and public health activities centered on the ORR. These activities have been conducted by the National Center for Environmental Health, the National Institute for Occupational Safety and Health, the Agency for Toxic Substances and Disease Registry (ATSDR), the Centers for Disease Control and Prevention, and the Tennessee Department of Health.

Several government agencies have moved to address concerns over potential health problems.

ATSDR and its Oak Ridge Reservation Health Effects Subcommittee ceased their Oak Ridge activities in September of 2005 due to lack of funding for ATSDR health-related activities at DOE sites. As a result, planned activities meant to gather information and data to address the health concerns of the citizens of Oak Ridge and the surrounding communities were unfinished and deferred.

ATSDR uses the public health assessment (PHA) to evaluate the potential impact of ORR hazardous releases on the health of nearby communities. PHAs released in FY 2006 include:

- Contaminated Off-Site Groundwater from the ORR PHA,
- Evaluation of Current and Future Chemical Exposure PHA, and
- TSCA Incinerator PHA.

Unfinished activities include:

- Iodine-131 Releases PHA,
- Assessment of Cancer Incidence in Counties Adjacent to Oak Ridge Reservation Health Consultation,
- White Oak Creek Radionuclide Releases PHA,
- PCB Releases PHA,
- K-25 Releases PHA, and
- Mercury PHA.

6.0 Health Studies & Emergency Response

6.2 EMERGENCY RESPONSE

6.2.1 Tennessee Emergency Management Agency

TEMA is the state's emergency management arm. Located within the Military Department of Tennessee, TEMA provides technical assistance, supplies, equipment, and training to local governments. The agency also administers funding from the state and federal governments.

TEMA operates a 24-hour emergency operations center. This center manages emergency information and coordinates state and federal assistance from one location.

TEMA operates a 24-hour emergency operations center, which coordinates state and federal assistance.

Under the TOA, DOE is required to provide technical and financial assistance for emergency response. TEMA is the primary state agency responsible for implementing the following provisions:

- Developing and maintaining the state's Multi-Jurisdictional Emergency Response Plan for ORR facilities in accordance with federal laws and regulations;
- Organizing and participating in annual emergency response exercises and drills with affected state agencies and local governments;
- Training state and local government employees and officials, as well as volunteers who may be called upon in the event of an emergency at the ORR; and
- Acquiring and maintaining equipment—with funds provided by DOE—for TEMA and affected counties to support the Emergency Response Plan.

The Emergency Response Plan is the basic plan that describes general concepts that guide the off-site response to an emergency at the ORR. This plan is shared with emergency response organizations in Anderson, Knox, Loudon, and Roane counties. It provides the purpose, scope, and execution of the plan; the state's mission; assignment of emergency responsibilities and actions; and descriptions of the major emergency response organizations.

6.2.2 TDEC DOE Oversight Division

The division maintains the capability to respond to environmental emergencies and supports TEMA in technical issues that may result from DOE activities in Oak Ridge. The division is constantly accessible to TEMA through the use of a dedicated duty person and a 24-hour paging system.

The division participates each year in a series of exercises in Oak Ridge. These exercises involve DOE, TEMA, and local agencies from Anderson, Knox, Loudon, and Roane counties. In FY 2006, the full participation emergency exercise scenario was a tornado striking ETTP.

6.0 Health Studies & Emergency Response

In an emergency or exercise, the division maintains and fully staffs the Environmental Monitoring Control Center and Environmental Field Monitoring Teams. The Environmental Monitoring Control Center is located at TEMA–East in Alcoa. The Environmental Field Monitoring Teams are dispatched from Alcoa. In addition, the division supplies a staff member to the Field Coordination Center and to DOE's Joint Information Center in the Powell community of Knox County.

The division is constantly accessible to TEMA through the use of a dedicated duty person and 24-hour paging system.

The division supports TEMA through development of a system to track and evaluate reportable occurrences at the ORR. Daily occurrence reports are sent to the division.

There were no emergencies involving off-site releases in FY 2006.

7.0 Outreach

The division conducts public outreach at the local, state, and national levels, providing information to help the public understand both the ORR's environment and the impact of DOE operations. The division also maintains a Web site with detailed information about ORR environmental issues at <www.tennessee.gov/environment/doeo/index.shtml>.

Other community organizations that monitor DOE activities in Oak Ridge also seek to include the public in their work. In addition, DOE has an extensive outreach program to solicit public input on environmental concerns, and the agency has established an information center to give stakeholders direct access to relevant documents.

Outreach programs enable the public to play a meaningful role in environmental decision-making. Following are the major public outreach efforts undertaken by a variety of organizations concerned with DOE's environmental management program at Oak Ridge. Contacts for local and state initiatives—including addresses, phone and fax numbers, and Web sites—are listed in the Appendix.

7.1 TDEC DOE OVERSIGHT DIVISION

7.1.1 Local and Regional Activities

The division works with the following local and regional organizations on issues associated with the ORR:

- Watts Bar Interagency Group (see sidebar),
- Tri-State Depleted UF_6 Working Group,
- Oak Ridge Reservation Local Oversight Committee (LOC),
- Oak Ridge Site Specific Advisory Board,
- Secret City Festival Booth, and
- First United Methodist Church Earth Day Booth.

7.1.2 National Activities

At the national level, division staff members participate in a wide range of initiatives that affect the ORR, the Oak Ridge community, or the state. These initiatives include involvement in the following groups:

WATTS BAR INTERAGENCY WORKING GROUP

The Watts Bar Interagency Working Group Agreement allows federal and state agencies to coordinate their review of activities at Watts Bar Reservoir, specifically those that may disturb sediments that have been or may have been contaminated by DOE releases in Oak Ridge. In particular, the agreement looks to permitting and other use authorization by the U.S. Army Corps of Engineers and TVA, with these agencies reviewing proposed activities with DOE, TDEC, and EPA. The agreement does not limit the authority of any of these agencies; instead, it allows the group to collect and review relevant data and make a joint recommendation to the permitting agencies for consideration during the permitting decision.

Interstate Technology and Regulatory Council. The Interstate Technology and Regulatory Council was formed in 1995 as a multi-state coalition working to achieve

regulatory acceptance of innovative environmental technologies. The state-led council became affiliated with the Environmental Council of States in 1999 and has been working closely with that organization to promote the examination of innovative technology for conducting more cost-effective and efficient site cleanups. The division has a representative on the Radionuclides Team. The team published *Real-Time Measurement of Radionuclides in Soil: Technology and Case Studies* in February 2006 and is in the process of developing an internet training session for release in November 2006. Currently the team is also developing another document dealing with the D&D of radionuclide-contaminated DOE sites.

The National Governors Association Federal Facilities Task Force. The task force is composed of governor-appointed policy and technical representatives from states hosting major DOE facilities. Task force members work collaboratively with DOE officials on technical, economic, and political challenges, including budget and regulatory issues, waste treatment and disposal options, and equitable decisions on waste management.

The National Conference of State Legislatures' State and Tribal Government Working Group. The State and Tribal Government Working Group is a forum in which all tribes affected by DOE sites can interact directly with the states and DOE. The working group helps ensure that DOE facilities are operated and cleaned up in compliance with all applicable federal and state laws and regulations and tribal rights. These rights include those retained by treaty, and conferred by statute and the trust responsibility. Remedies must also protect human health, safety, and the environment.

Intergovernmental Meeting with the U.S. Department of Energy. The Energy Communities Alliance, Environmental Council of the States, National Association of Attorneys General, National Governors Association, and State and Tribal Government Working Group meet annually with DOE. The meeting provides an opportunity for senior DOE officials to talk with these groups collectively. It also allows the groups to coordinate on issues involving the operation and cleanup of the DOE Complex.

The Association of State and Territorial Solid Waste Management Officials Radiation Task Force. This organization tracks radiation-related issues that could affect states. The group emphasizes federal facility issues and has cooperative projects with the Council of Radiation Program Directors, the Health Physics Society, and the American National Standards Institute. This past year the division presented two papers for the association at an EPA-sponsored conference on institutional controls. The papers were "Perpetual Care Trust Fund in Tennessee" and "Background on Setting Fishing Advisories."

The Tri-State (Tennessee, Kentucky, and Ohio)/DOE Depleted Uranium Hexafluoride Working Group. This group has worked on UF_6 management and transportation issues since 1997. Representatives currently have weekly conference calls to coordinate transportation of UF_6 from Oak Ridge to the Portsmouth Gaseous Diffusion Plant. If work goes as planned, the shipment campaign will be finished during FY 2007.

7.2 OAK RIDGE RESERVATION LOCAL OVERSIGHT COMMITTEE

Representatives from the division participate in meetings of the LOC, an organization chartered under the TOA. The LOC's mission is to ensure that the best interests of member communities are protected and that public funds are used wisely during cleanup, continued operation, and reindustrialization at the ORR. The LOC is governed by a board of directors, which includes local elected and appointed officials from the city of Oak Ridge and the counties of Anderson, Roane, Knox, Loudon, Meigs, Rhea and Morgan. Board members are concerned with human health and the environment, emergency management, and impacts on their communities' economic and social well being.

The board is advised by a 20-member Citizens' Advisory Panel (CAP), which was created in early 1995 to provide advice based on in-depth reviews of DOE documents and studies of community concerns. CAP meetings often begin with presentations by experts on issues of current interest to the greater Oak Ridge community.

CAP members attend meetings of other organizations concerned with environmental, economic, and health issues in order to better evaluate the range of stakeholder opinions. The CAP regularly transmits public concerns to the LOC Board and to DOE, EPA, and various divisions within TDEC.

In the past year, issues addressed by the LOC and the CAP have included the following:

- The environmental management budget process and its implications for cleanup on the ORR,
- Accelerated cleanup impacts on future land use and reindustrialization;
- Community concerns over long-term stewardship of remediated sites;
- D&D and remediation decisions at ETTP, with emphasis on problems encountered on the K-25/K-27 project;
- Historic preservation on the ORR and its appropriate integration with cleanup planning and activities;
- Capacity and use of the CERCLA waste disposal facility for various cleanup wastes;
- Political issues related to the decision-making process for waste disposal, especially remote-handled TRU waste; and
- Review of circumstances and emergency response efforts for actual incidents and exercises in FY 2006.

TDEC photo

Division Director John Owsley (right) chats with John Evans, vice chairman of the Local Oversight Committee.

7.0 Outreach

The LOC's outreach efforts include presentations to community groups and governmental entities, an internet presence at <www.local-oversight.org> and an e-mail news list. The LOC is staffed by an executive director and an administrative assistant. For further information about the LOC or to be added to the e-mail news list, contact Susan Gawarecki in Oak Ridge by phone at (865) 483-1333, toll free at (888) 770-3073, or by e-mail at loc@icx.net.

7.3 LOCAL GOVERNMENT ENVIRONMENTAL BOARDS

7.3.1 Oak Ridge Environmental Quality Advisory Board

The Oak Ridge Environmental Quality Advisory Board is an official board of the city of Oak Ridge. Its members are appointed by the City Council, and the board, in turn, advises the City Council on environmental issues. Because the ORR is largely within the city limits of Oak Ridge, one of the board's primary functions is to review and comment on DOE cleanup activities that potentially affect the city. The board's Web site is found at <www.cortn.org/eqab/oakridge.htm>.

7.3.2 Roane County Environmental Review Board

Members of this official Roane County governmental board are appointed by the county executive and confirmed by the County Commission. The board advises both the county executive and the commission on environmental matters, including those resulting from the presence of two major ORR facilities—ORNL and ETTP—in Roane County. Roane County continues to attract commercial waste management firms interested in doing business with DOE and outside clients. In addition, three incinerators on or near the ORR are situated within county boundaries. The east end of Roane County will have a variety of DOE-related cleanup, waste management, and transportation issues to monitor for years to come.

7.4 DOE PUBLIC INVOLVEMENT

DOE works with TDEC and EPA to foster public involvement in environmental remediation decision-making. Opportunities may include informal conversations, electronic communications, scheduled meetings and workshops, legally required permit hearings, and stakeholder advisory groups.

Some portions of DOE's public involvement program are required under CERCLA and specified in the FFA. A Public Involvement Plan, updated every 3 years, is one example.

7.4.1 Public Involvement and Outreach

DOE's Community Relations office produces two publications distributed to interested individuals. The monthly *Public Involvement News* summarizes upcoming public meetings, announcements, availability of documents, pending NEPA actions, and opportunities for public involvement. *Cleanup Progress* is an annual report highlighting

DOE's environmental management activities and decisions of the preceding fiscal year. It also fulfills the annual regulatory reporting requirement under the FFA. Individuals can be added to the Community Relations mailing list by contacting Walter Perry, manager of community relations for DOE's Oak Ridge environmental management program, at (865) 576-0885, or they can pick up a copy of either publication at the DOE Information Center, 475 Oak Ridge Turnpike in Oak Ridge.

Environmental management activities are also detailed on the internet at <www.oakridge.doe.gov/external/Programs/EnvironmentalManagement/tabid/42/Default.aspx> and at <www.bechteljacobs.com>. These Web sites provide links to public documents, meeting and event calendars, and other information sources.

7.4.2 Oak Ridge Site Specific Advisory Board

The Oak Ridge Site Specific Advisory Board is an advisory committee to DOE's environmental management organization and is chartered under the Federal Advisory Committee Act of 1972.

The board provides advice to DOE's Oak Ridge environmental management program both on policy issues and on specific decision documents. The board consists of up to 20 members from the greater Oak Ridge region who are concerned about environmental restoration and waste management. Representatives from TDEC, DOE, and EPA Region 4 attend meetings as non-voting members to act as a resource for information and to hear concerns of the board. The board's standing committees are Environmental Management and Stewardship.

All board and committee meetings are open to the public and are announced in newspaper advertisements, in the Federal Register, and at the Information Resource Center in Oak Ridge. Board meetings are recorded on video, and copies of the tapes are available for public review. The board produces a quarterly newsletter called "The Advocate," and its Web site is at <www.oakridge.doe.gov/em/ssab/>. Information is also available by calling the board's support office (see Appendix).

7.4.3 National Environmental Policy Act

NEPA requires federal agencies to provide public officials and citizens with environmental information for proposed federal actions that could affect environmental quality. This is accomplished through the preparation of one of two documents: an environmental impact statement if the proposed action will have a significant impact on environmental quality, or an environmental assessment if the impact is not significant. The environmental impact statement requires public involvement and access to information regarding DOE proposals. Formal public meetings are held in conjunction with the scoping and release of an environmental impact statement, giving regulators and citizens an opportunity to comment openly on DOE's planned activities.

7.0 Outreach

In 1994, DOE adopted a policy that combines the public involvement procedures of NEPA and CERCLA for major cleanup decisions. This policy states, "CERCLA documents will incorporate NEPA values, such as analysis of cumulative, off-site, ecological, and socioeconomic impacts, to the extent practicable." DOE's policy and announcements on pending NEPA actions are available on its Web site at <http://tis-nt.eh.doe.gov/nepa>.

7.4.4 DOE Information Center

The DOE Information Center is the repository for all publicly available material about DOE's Oak Ridge Operations. The Information Center, located at 475 Oak Ridge Turnpike, is also the official repository for all information and documents that support or compose the administrative record for the FFA. This includes such information as newspaper articles related to the ORR, official correspondence, and decision documents on site remediations. It is also the storage area for documents requested under the Freedom of Information Act, newly released or declassified files and information dealing with health issues, and documents covering all aspects of the ORR's environment not otherwise part of the administrative record.

These files are accessible to the public and may be read on the premises, or the staff will copy documents on request. The Information Center's phone number is (865) 241-4780.

Photo by Fay Martin

Division Assistant Director Dale Rector meets with Oak Ridge students who helped set up a local Earth Day festival.

Appendix

Local Government & Stakeholder Organizations

The Oak Ridge Reservation Local Oversight Committee, Inc. (LOC)
Susan Gawarecki, Executive Director
102 Robertsville Road, Suite B
Oak Ridge, TN 37830
Phone: (865) 483-1333
Fax: (865) 482-6572
E-mail: loc@icx.net
Web site: www.local-oversight.org

City of Oak Ridge Environmental Quality Advisory Board
Ellen Smith, Chair
City of Oak Ridge, P.O. Box 1
Oak Ridge, TN 37831-0001
Phone: (865) 482-8320
Fax: (865) 425-3426
E-mail: EQAB@cortn.org
Web site: www.cortn.org/eqab/oakridge.htm

Roane County Environmental Review Board
Roane County Courthouse
P.O. Box 643
Kingston, TN 37763
Phone: (865) 376-5578
Fax: (865) 376-4318

Oak Ridge Site Specific Advisory Board
Lance Mezga, Chair
Spencer Gross, ORSSAB Support Office
P.O. Box 2001, EM-90
Oak Ridge, TN 37831
Phone: (865) 241-4584
Fax: (865) 574-3521
E-mail: GrossRS@oro.doe.gov
Web site: www.oakridge.doe.gov/em/ssab/

League of Women Voters of Oak Ridge
P.O. Box 4073
Oak Ridge, TN 37831-4073
Phone: (865) 482-2243
E-mail: lwvor@comcast.net
Web site: www.lwvor.com

Community Reuse Organization of East Tennessee
Lawrence Young, President
107 Lea Way
P.O. Box 2110
Oak Ridge, TN 37831-2110
Phone (865) 482-9890
Fax (865) 482-9891
E-mail: younglt@croet.com
Web site: www.croet.com

Energy, Technology and Environmental Business Association
Alice Murphy, Executive Director
P.O. Box 5483
Oak Ridge, TN 37831-5483
Phone: (865) 945-1386
Fax: (865) 945-1385
E-mail: alice@eteba.org
Web site: www.eteba.org

Atomic Trades and Labor Council
P.O Box 4068
Oak Ridge, TN 37831-4068
(865) 574-0153
Web site: www.atlcunion.org

Paper, Allied-Industrial, Chemical, and Energy Workers International Union
Local 5-288
133 Raleigh Road
Oak Ridge, TN 37830
Phone: (865) 483-3745
Fax: (865) 483-6460

Advocates for Oak Ridge Reservation
136 West Revere Circle
Oak Ridge, TN 37830
Phone: 865-483-0849
E-mail: aforr@discoveret.org
Web site: www.discoveret.org/aforr

Appendix

Other Federal Agencies

Agency for Toxic Substances and Disease Registry
Jack Hanley, Environmental Health Scientist, Oak Ridge Reservation Site Team Lead
ATSDR/DHAC
1600 Clifton Road, NE (E-32)
Atlanta, GA 30333
Phone: (404) 498-0358
Fax: (404) 498-0063
E-mail: jah8@cdc.gov
Web site: www.atsdr.cdc.gov/HAC/oakridge/

State Contacts

Tennessee Department of Environment and Conservation
Department of Energy Oversight Division

761 Emory Valley Road
Oak Ridge, TN 37830
Phone: (865) 481-0995
Fax: (865) 482-1835
E-mail: John.Owsley@state.tn.us
Web site: www.state.tn.us/environment/doeo

John Owsley
Director

Dale Rector
Assistant Director

Kristof Czartoryski
Waste Management

Jim Harless
Environmental Monitoring and Compliance

Doug McCoy
Environmental Restoration and FFA Manager

Charles Yard
Radiological Monitoring and Oversight

Tennessee Military Department
Tennessee Emergency Management Agency

Elgan Usrey
Director, Recovery and DOE Programs
3401 Sidco Drive
Nashville, TN 37204-1502
Phone: (615) 741-0001
Fax: (615) 242-9635
E-mail: eusrey@tnema.org
Web site: www.tnema.org

Bob Roddy
East Region DOE Program Manager
836 Louisville Road
Alcoa, TN 37701
Phone: (800) 533-7343 (in state)
Phone: (865) 981-5640
Fax: (865) 981-5610
E-mail: broddy@tnema.org

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